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CIO

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Measuring Project Success

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HR Transforms IT at Duke Energy

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Are Today's Auto Dealers Yesterday's Model?

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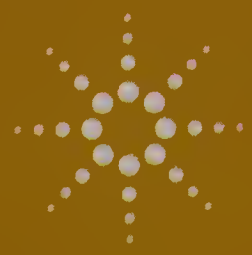

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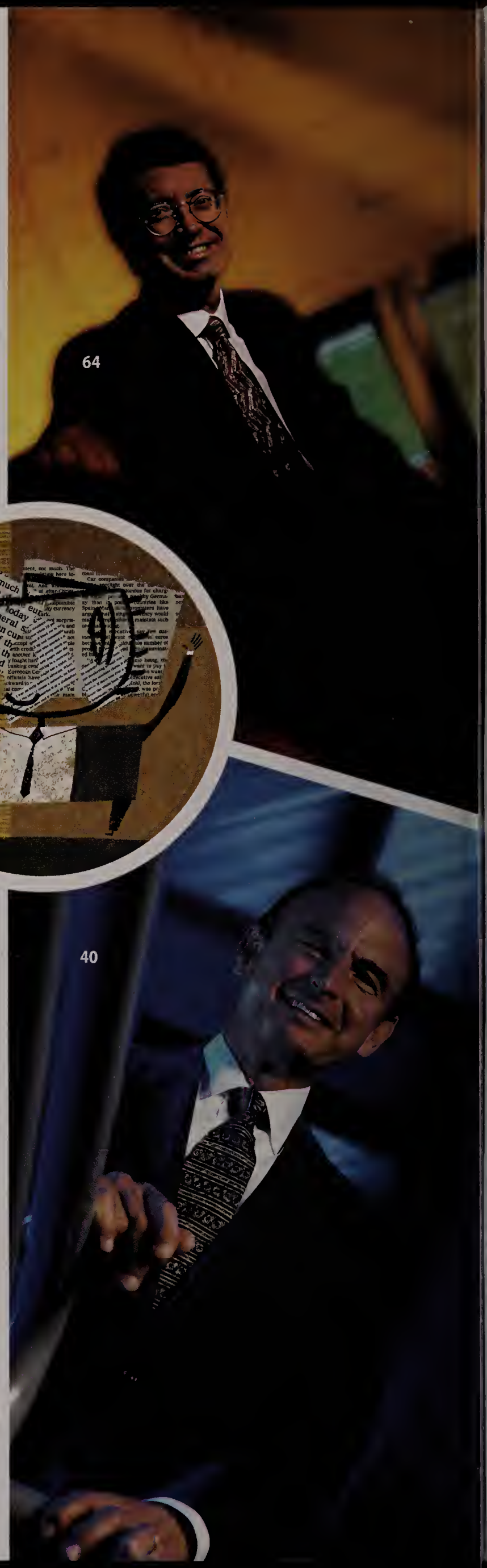

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LEARNING CURVE ATM promises high reliability, but it's complex and expensive.

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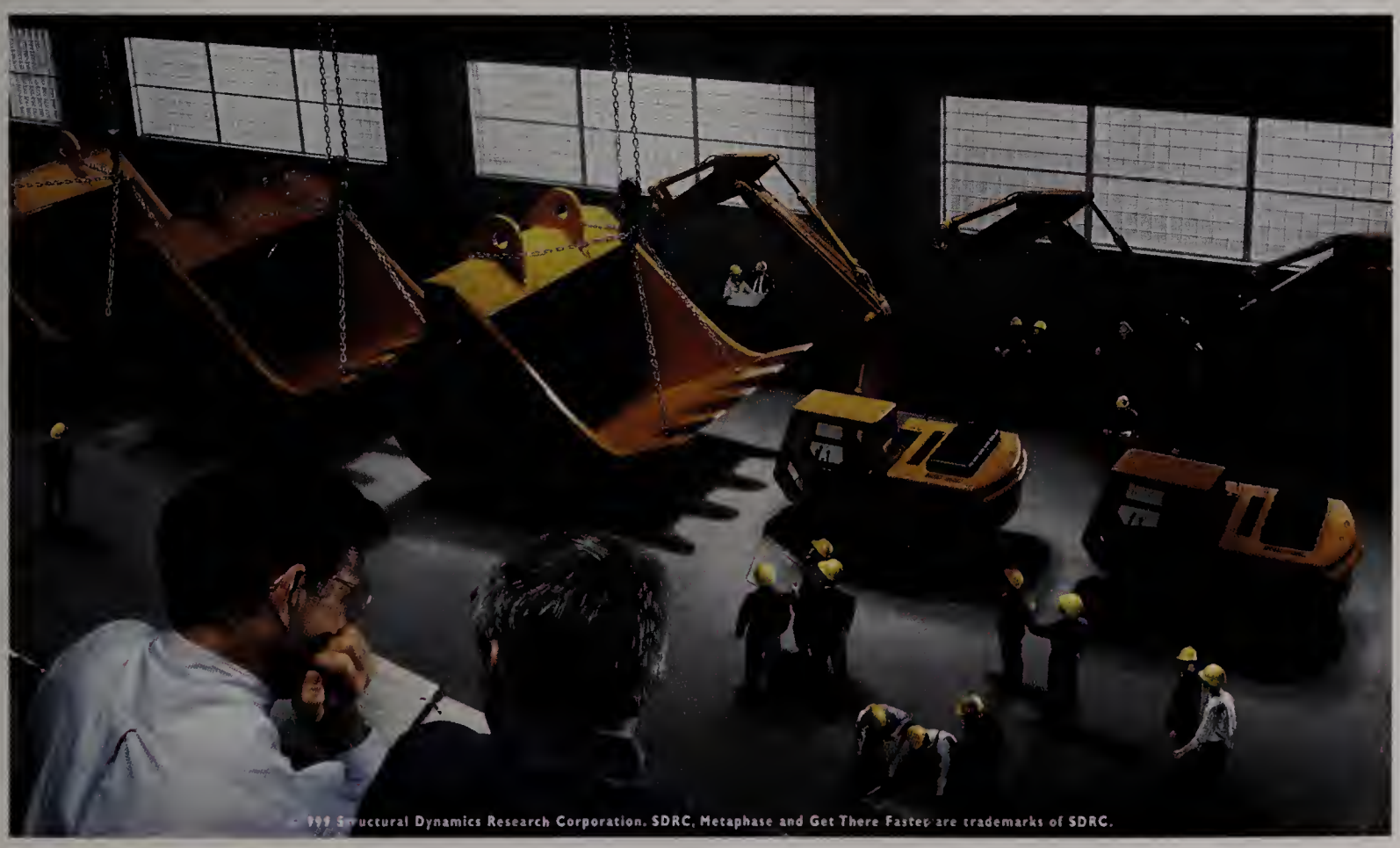

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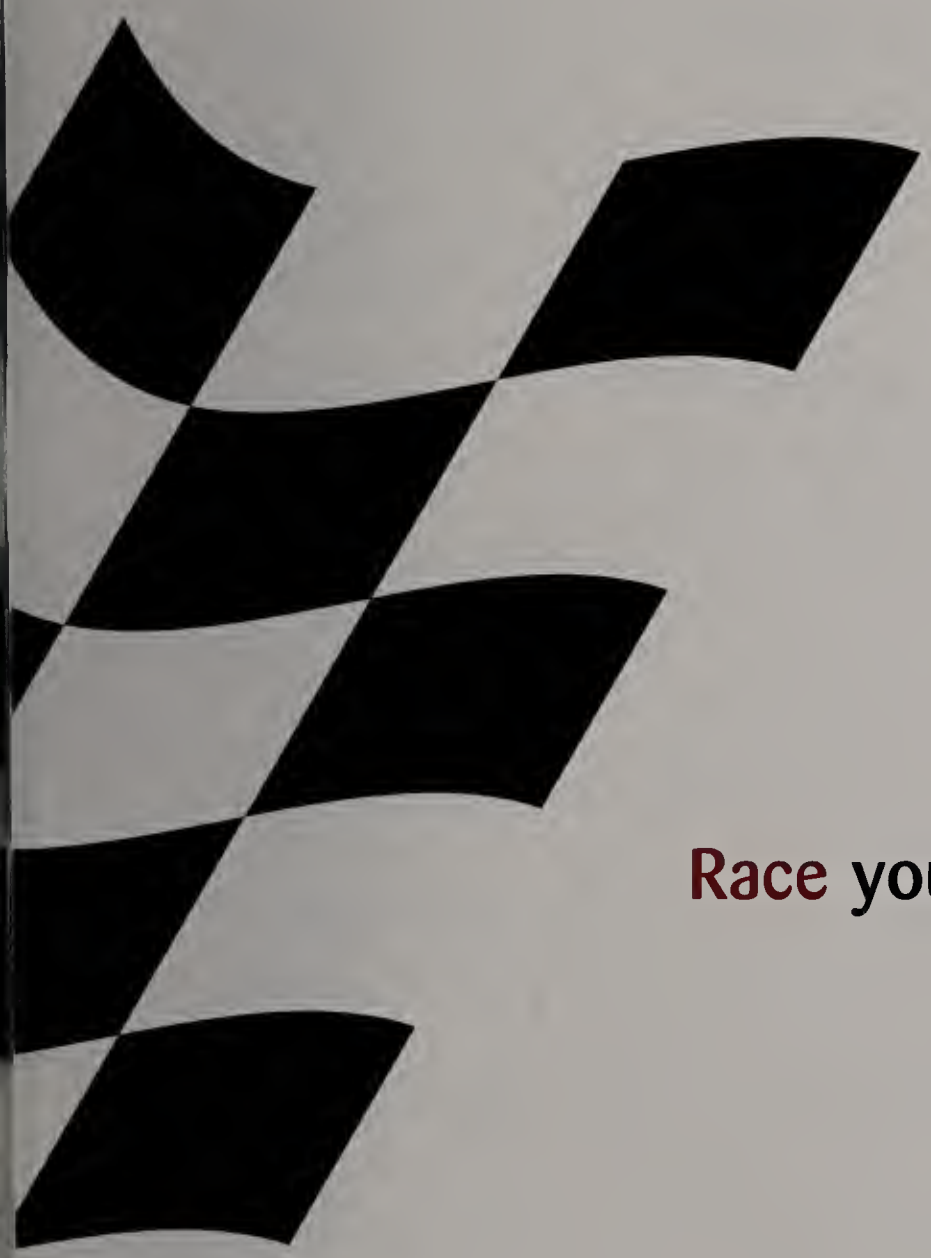

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In Box

LETTER FROM THE EDITOR, READER FEEDBACK AND HOW TO REACH US

The battle for the customer has never been fiercer, and CIOs are building the weaponry that will win or lose the war. The Internet has changed the terms of this competition. "In an age of instant comparison shopping, customers will not care to be owned," writes Senior Writer Derek Slater in "Car Wars," beginning on Page 40. They expect to be wooed not once but forever, in a virtually endless courtship.

Derek's observation applies to all product categories, not just cars. To hold onto customers, retailers must know more than ever about each and every contact, including those that don't end in a sale.

Companies have little latitude on this point. Here's an example from my own experience. I recently returned a product to L.L. Bean, widely viewed as a paragon of customer service. I included the order number and explained that this was the second of these products I had to return because of a defect. I assumed the returns department would access my account, verify my claim and promptly issue a refund. I invited them to call me if they had any questions.

Imagine my surprise when the product arrived back on my doorstep two weeks later with a form postcard saying that the company couldn't prove it was theirs. Three phone calls later, first to customer service, then to returns, then to the research department, I was offered this solution: Send the product back—again—and include all the pertinent information—again.

If L.L. Bean were tracking the right information and giving the right people access to it, it would know three important things about me. First and most obviously, it would know that I bought this product there and that I had already returned one because of defects. Second, it would know that in at least four of my recent shopping attempts, a number of products I wanted were no longer available. Between these two things, the company would know that I was already discontented. Third, if L.L. Bean were really good, it might even know that I buy as much as I can through the mail and that I have a family of four. We're not talking an insignificant amount of money here.

But the company's reps didn't even find the original transaction, even though I had provided the order number. And when they did finally track it down, they further inconvenienced an already unhappy customer by insisting I write another note and make another trip to the post office before they'd give me a refund. Yes, they admitted it was their mistake, but they did nothing to make amends in order to hold onto a lucrative customer on the verge of taking her business elsewhere.

Around the same time, I bought a few things from Lands' End. After my second purchase, a Lands' End customer service rep called to see if I was happy with the clothes I had ordered and if she could answer any questions. It doesn't take an MBA to guess where I'll be doing my shopping this fall.

The lesson in all this, of course, is that no one can rest on their laurels, and there's always an opportunity for someone who understands better what customers want and how best to give it to them. Complacency can be fatal.

Abbie Lundberg
lundberg@cio.com

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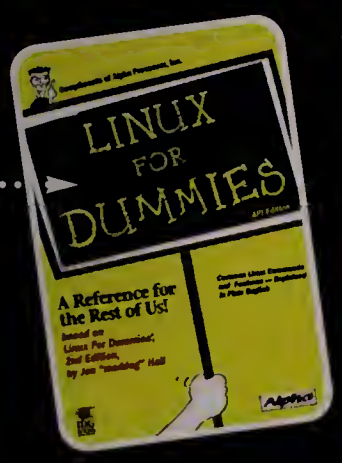

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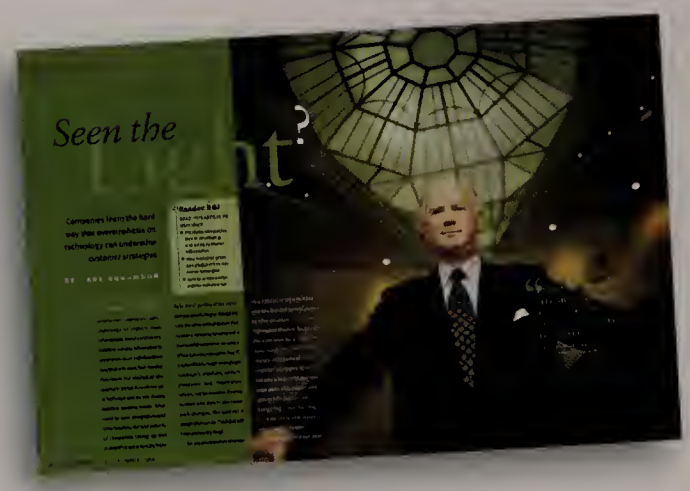
In Box

A CUSTOMER SPEAKS OUT

"Seen the Light?" [*CIO* Section 2, June 15, 1999] struck a cord with me. In particular, Rodger McArthur's comment, "Everyone wants to sell me a solution, but nobody wants to know what my problem is," got my attention.

When I signed up for cable TV service, what I wanted from my cable provider was clear television reception. This need was met with basic service, which provided reception for the local stations, access to a few other stations that were of interest as well as a load of programming that I had no interest in. Over the course of five years the cost of this basic service increased annually until it was approaching a 50 percent increase. When service was out for three consecutive days after an electrical storm, I asked for a billing credit for those three days. The answer was an unequivocal no. That pushed me over the edge and I canceled the service. The $120 I spent for an antenna mounted to the chimney pulls in what my family watches just fine.

I offer this story as an example of a business not paying attention to its customers. This perceived attitude could possibly affect future business. If the cable company raised access prices without providing increased TV service then it would stand to reason that it would do the same with cable Internet access. If its customer service is lackluster with cable TV, I would expect the same level of service with its Internet access. For those who conduct business over the Internet from home, telecommute or rely on the Internet for education, access disruptions of any sort would be at least an inconvenience if not unacceptable.



Cable TV providers that do not understand their customer needs not only lose customers but also lay the groundwork for a decreased customer base for Internet-cable initiatives.

Erik Gilliam
Information Systems Administration and Planning Manager
Science Applications International Corp.
Washington, D.C.

THE GOOD WITH THE BAD

In "The Net Changes (Almost) Nothing" [*CIO* Section 1, July 1, 1999], Tom Davenport writes, "What is truly impressive and different about the Internet is the ease of getting information."

The problem with this statement is that the information retrieved is assumed to be good or useful. But surely that is not necessarily the case. If I am looking for some information on a given topic and turn to the Web to gain it, how am I to distinguish between what is valuable and correct from what is wrong?

Of course, better search engines, such as Google, can help, but what makes the results useful is my ability to recognize the good from the bad—which is hardly a skill gained through the Web.

If your point was that the information was (assumed to be) good, then what makes the Internet better at getting good information than, say, a good reference librarian? The Internet has the possibility of democratizing the information. Instead

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In Box

of a library or reference librarian holding the keys to information, I can. And that holds true for most other people.

I had a professor friend who was searching for a rare book. He had used a number of the best rare book search agencies, spending quite a bit of money. After years of searching, the agencies (professionals at finding rare books) told him that his search was futile.

As the Internet started to take off, he happened to post in a design newsgroup his desire to find this book. Within a few hours he had not only found a number of copies of the book but was able to buy the book for a nominal amount. The Internet brings individuals together who would not normally be able to interact.

Given my argument, a company should be interested in e-commerce since it has the power to bring together customers who would not normally be able to interact with the company. The focus on immediacy should be replaced with a focus on creating trust. Pure sales literature Web sites are insufficient for this purpose.

Brad Rickelman
Manager, Technical Documentation
Doug Carson & Associates Inc.
Cushing, Okla.
brickelman@dcainc.com.

NOT ALL STANDARDS ARE GOOD

Lauren Gibbons Paul's article on single sourcing, "Going Steady" [*CIO* Section 1, July 15, 1999], is, on the whole, excellent.

However, she missed one point that's critical to some employees and often overlooked by people setting corporate standards for computer purchasing.

Let me point out the case of a company that settled on IBM ThinkPads as its laptop offering and failed to consider that some of their employees are physically incapable of using the "eraserhead" pointing device. The company's lame solution was to offer each employee a mouse, which does not usually work when traveling—the obvious reason why an employee would have a laptop in the first instance.

The issue for two of the employees is that they have extensive lymphedema as a result of breast cancer surgery and do not have the degree of control over their fingers that is necessary to "drive" an eraserhead. But they're both successful users of touchpads and trackballs.

While neither of these women considers herself "disabled," using the Americans with Disabilities Act (ADA) was the only way they were able to get their employer's attention. That shouldn't have been necessary.

Virginia R. Hetrick
Senior Consultant
Custom Solutions Group, Ciber Inc.
El Segundo, Calif.
drjuice@gte.net

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Closing The Loop To Optimize Customer Relationships

BY HENRY MORRIS
RESEARCH VICE PRESIDENT,
DATA WAREHOUSING
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WHITE PAPER

BY HENRY MORRIS

Closing The Loop To Optimize Customer Relationships

What are the requirements for a solution that optimizes customer relationships? A customer relationship management (CRM) system should combine transaction processing with the analysis of customer interactions, leading to the optimization of each future interaction via integrated customer touchpoints. Sequent has packaged software, hardware and services to deliver one of the most impressive closed loop systems available on the marketplace. There is a sophisticated data and processing architecture to ensure the scalability and availability of the total system. This support is critical in order to provide a robust system that brings the latest customer information directly to the point of customer interaction, whether it be through a Web, telephone, fax or e-mail channel. There has been much discussion about the benefits of closed loop systems, but few examples of such systems are in actual use. Yet Sequent's customer relationship management solution is being deployed today in highly demanding settings. With careful attention to systems design and valuable delivery experience, Sequent is prepared to deliver an integrated whole that is more than the sum of its parts.

Customer Relationship Optimization: Linking Information to Actions

Companies are turning to data warehousing and powerful analytical tools in order to maximize business opportunity. Through the use of techniques that lead to more personalized customer relationships, companies can more readily retain and grow business with existing customers, as well as attract new customers.

The marketplace is beginning to understand that optimizing customer relationships requires the strategic use of customer information in every customer interaction via multiple customer-facing channels. But data pertaining to a company's relationship with its customers is typically scattered, maintained by separate applications written to support each major type of customer interaction. Hence, a requirement for optimizing customer relationships is to bring this information together into a data warehouse for analysis, and then to strategically use the results of the analysis during the next interaction.

Data warehousing is a process that integrates data from multiple sources organized for decision support. IDC forecasts that the data warehousing software market will surpass $12B by 2002, a compound annual growth rate of 24.3 percent. (See "Data Warehousing: Worldwide Overall Market, 1997-2002," IDC #17797). Customer relationship management will be the leading subject area for data warehousing as businesses seek to gain better intelligence on their customers as a source of competitive advantage.

But integrating data in a data warehouse and analyzing patterns in customer data are not sufficient for optimizing customer relationships. These activities are only useful if the results of the analysis can be linked directly to actions that affect the quality of a business's relationship with a customer. For maximum impact, the results of the analysis should be made usable right at the time of each customer interaction, through whichever channel the

The market for packaged applications that manage customer interactions—sales, marketing and customer support—will grow to nearly $8B by 2002.

customer uses to touch the organization. IDC projects that the market for packaged applications that manage customer interactions—sales, marketing and customer support—will grow to nearly $8B by 2002, a compound growth rate of 43.9 percent.

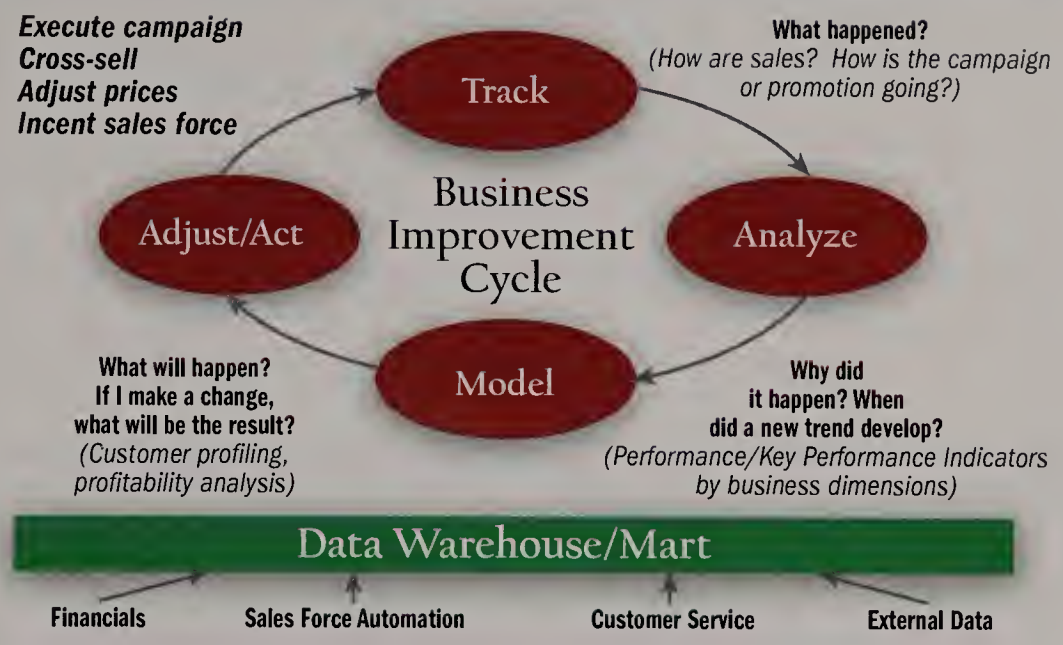
CLOSING THE LOOP: THE BUSINESS IMPROVEMENT CYCLE

Figure 1 shows the link between transaction processing (i.e. operational) and analytic systems as a cycle that IDC calls the business improvement cycle. Within a particular process or family of processes (such as customer relationship management or procurement), operational applications cover the adjust/act and track phases, while analytic applications cover the analyze and model phases. Analytic applications are supported by a data warehouse which integrates internal and external information relevant to the business problem.

The business improvement cycle for a process that impacts business performance covers the following tasks:

- **Adjust/Act:** Adjustments are made to business rules (such as changing pricing or compensation) in order to achieve specific objectives. These are then put into action governing the transaction of business.
- **Track:** Transactions are applied to the operational database, and production reports reflect the events that have occurred. Business programs such as marketing or sales campaigns are monitored regularly.
- **Analyze:** Business trends are probed by analyzing recent data in order to understand why events have happened. This need is met by providing a view that shows key performance indicators (such as profit or return on equity) by business dimensions (such as organizational or product hierarchies).
- **Model:** Predictive models are built to help understand what will happen. A manager explores alternative scenarios (such as new policies on customer service) before putting the changes into effect. This completes one iteration of the cycle.

Closed Loop Systems: Business Improvement Cycle



Source: International Data Corporation,1999

Figure 1

When the constituent tasks of a business process are being performed, this cycle is traversed in a clockwise direction. However, it makes sense in a customer-oriented environment to design the process (and its supporting data flows) in a reverse direction. That is:

- Identify the opportunities for action (Adjust/Act).
- Calibrate the analysis and modeling to yield results that are actionable (Model and Analyze).
- Design the data flows to the data warehouse (from Track to Analyze) to ensure that the data necessary for the analysis is present.

The rate at which a business is able to move through these phases improves the velocity of information. A business will seek to traverse the cycle as rapidly as possible for processes that have a significant impact on overall performance and where trends can shift unexpectedly. Customer-centric processes fit this description. First, they are key determinants of business performance. Second, the data that records the behavior of customers is notoriously volatile.

This volatility requires that a business be able to respond as quickly as possible to the latest customer information. The velocity of information can be increased by automating the links that pass data between each phase of the cycle and by increasing the level of performance and availability for each link. The need for speed and the impact on business performance makes closed loop customer relationship management a business-critical system.

SYSTEM IMPLEMENTATION REQUIREMENTS

A business-critical system such as closed loop customer relationship management has demanding implementation requirements:

- **Scalability with Performance:** A customer interaction system, such as a call center application, requires the processing of a high volume of transactions with good response time. Meeting these response time requirements for a complete business transaction can require the coordination of database read and update operations for multiple systems in parallel, rather than having each execute separately. The related customer information system requires the movement and transformation of large data sets to a data warehouse for analysis of customer behavior patterns.

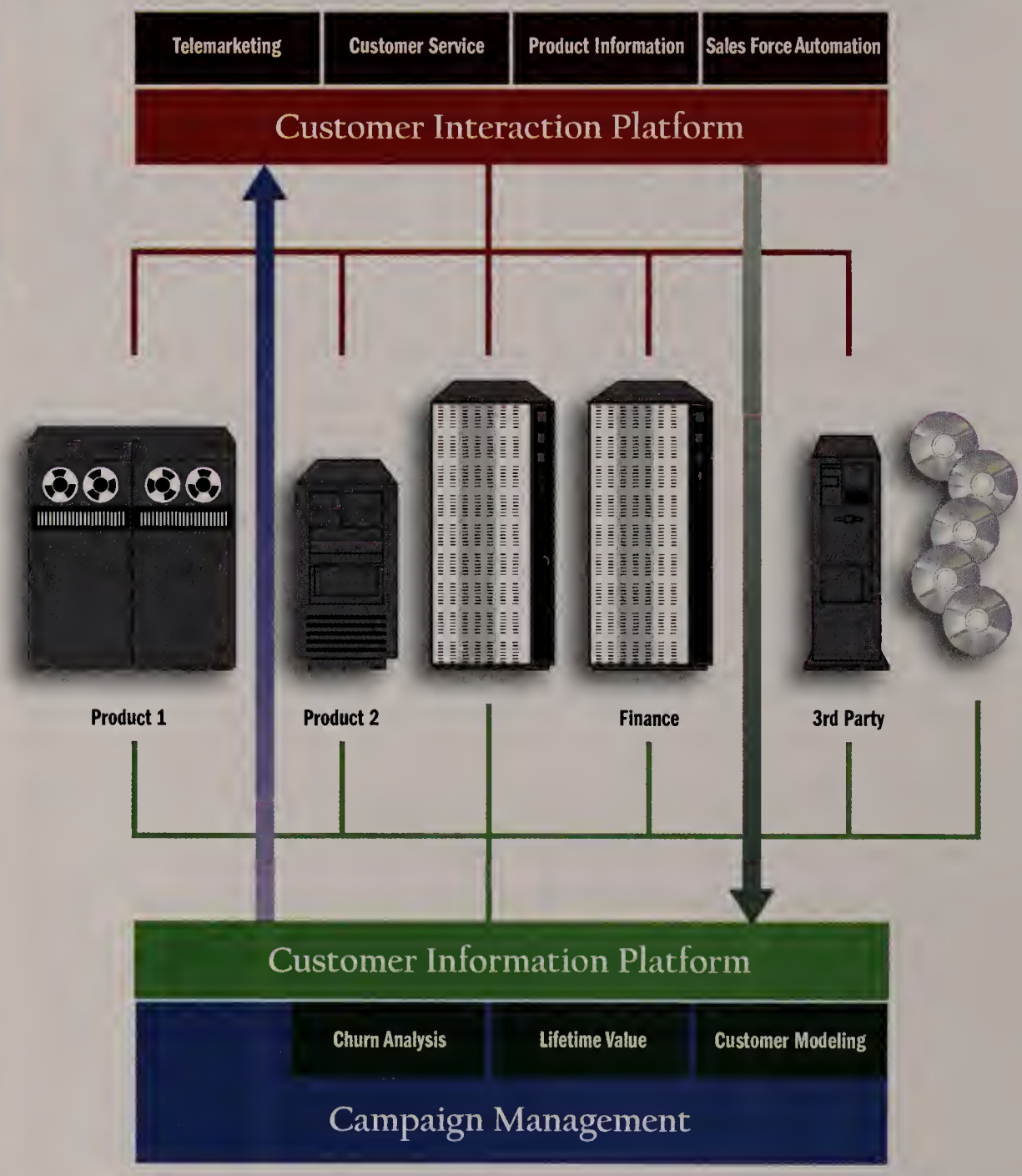
Yet the need for scalability will only increase as customer-facing channels merge into an integrated contact center and as we move into the e-commerce era. For example, beyond data on what was ordered, on-line retailers can analyze data on which catalog pages were touched by a Web shopper and which ads were displayed to that shopper. All of this is potentially relevant for predicting future customer behavior and tailoring treatment strategies within a current customer interaction, as well as for the next interaction with those target customers.

- **Availability:** Real-time customer interaction systems (such as call centers or contact centers) require near 7x24 availability. In general, businesses will find that with the introduction of e-commerce interaction solutions, availability requirements will be much higher than the availability of underlying operational systems. The supporting infrastructure for off-line analysis (populating and managing the data warehouse) is linked to this real-time system.

The demand for up-to-date, actionable information based on customer analysis drives higher levels of availability for the data warehouse and related analytic processes. IDC surveys have shown that availability is frequently cited as an implementation challenge for data warehousing.

- **Integration:** A closed loop is an extended business process supported by a complex information system. The overall system has many independent elements that must be brought together to solve a business problem. Domain knowledge and implementation expertise are needed to design and build the information flows at every step. A robust architecture is needed to ensure the smooth flow of information across the steps within a closed loop system.

Sequent CRM Architecture: Closed Loop Customer Relationship Management



Source: Sequent Computer Systems, Inc., 1999 Figure 2

Sequent's CRM Solution: A Closed Loop Implementation

Sequent's customer relationship management solution is a packaging of systems, software and services to facilitate the implementation of a closed loop system for customer relationship management. It was developed with these requirements in mind. Figure 2 provides a high-level view of the relationship between the customer interaction and customer information parts of the total system. The architecture enables a closed loop because data flows from the point of on-line customer interaction to the analytic systems and then back to the on-line system to direct future interactions.

The goal of the system design is to bring to bear the results of the analysis of customer behavior directly to those who interact with customers in a real-time environment. These could be the call center agents and sales representatives who need information that is directly related to their activities at precisely the time they must act.

This solution encompasses two related systems:

- **A customer interaction platform** supporting sales, marketing and customer service applications. These transaction processing applications manage real-time interaction with customers. Sequent calls this solution Contact Advantage.
- **A customer information platform** supporting customer-centric and analytic

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applications, such as lifetime value, campaign management, customer modeling and segmentation and churn/retention analysis. These analytic applications analyze the data trail of customer interactions, developing actionable information to optimize customer relationships. This is Sequent's Decision Advantage solution.

CONTACT ADVANTAGE: THE CUSTOMER INTERACTION PLATFORM

Figure 3 (on page S7) shows the customer interaction platform in more detail.

The customer interaction platform needs to support multiple applications and channels, including new Web-based points of contact, that record the events that directly touch a customer. These are heavy-duty, transaction processing systems that need to handle a large volume of work. To ensure customer satisfaction, good response time is required so as not to keep a customer waiting while data records are being accessed and updated.

A key element of the system is message-based middleware (the "message broker" in Figure 3) that manages queues which ensure the delivery of information between the customer interaction application, the customer interaction platform and core business applications such as inventory management and procurement.

The "message broker" also ensures the delivery of the customer scores (based on predictive modeling of data warehouse information) to the customer interaction platform where they are saved in customer data records. Applications such as customer service can then reference these scores in directing the way the current customer is to be served. For example, branching in call center scripts or personalization of Web pages must be made dependent on the customer's potential to churn or lifetime expected value. In this manner, the course of each new interaction is adjusted in real-time with reference to the collective intelligence owned by the business on that customer's expected behavior.

DECISION ADVANTAGE: THE CUSTOMER INFORMATION PLATFORM

Figure 4 (on page S8) shows the customer information platform in more detail.

Data flows from the customer interaction platform and its transaction-oriented databases (along with data from financial and product-centric applications, and external sources) to a data warehouse that forms the foundation of the customer information system.

The data warehouse supports the development of analytical models, yielding results such as customer segmentation, assessment of lifetime value and propensity to churn for individual customers. Scores are then assigned by applying each of the models to each customer and later are transferred to the customer interaction platform.

New data is collected based on the latest interactions and the cycle continues.

Sequent brings together many separate system components in a manner that supports the demanding requirements of closed loop system implementation.

MEETING SYSTEM IMPLEMENTATION REQUIREMENTS

With the delivery of Contact Advantage and Decision Advantage, Sequent brings together many separate system components in a manner that supports the demanding requirements of closed loop system implementation:

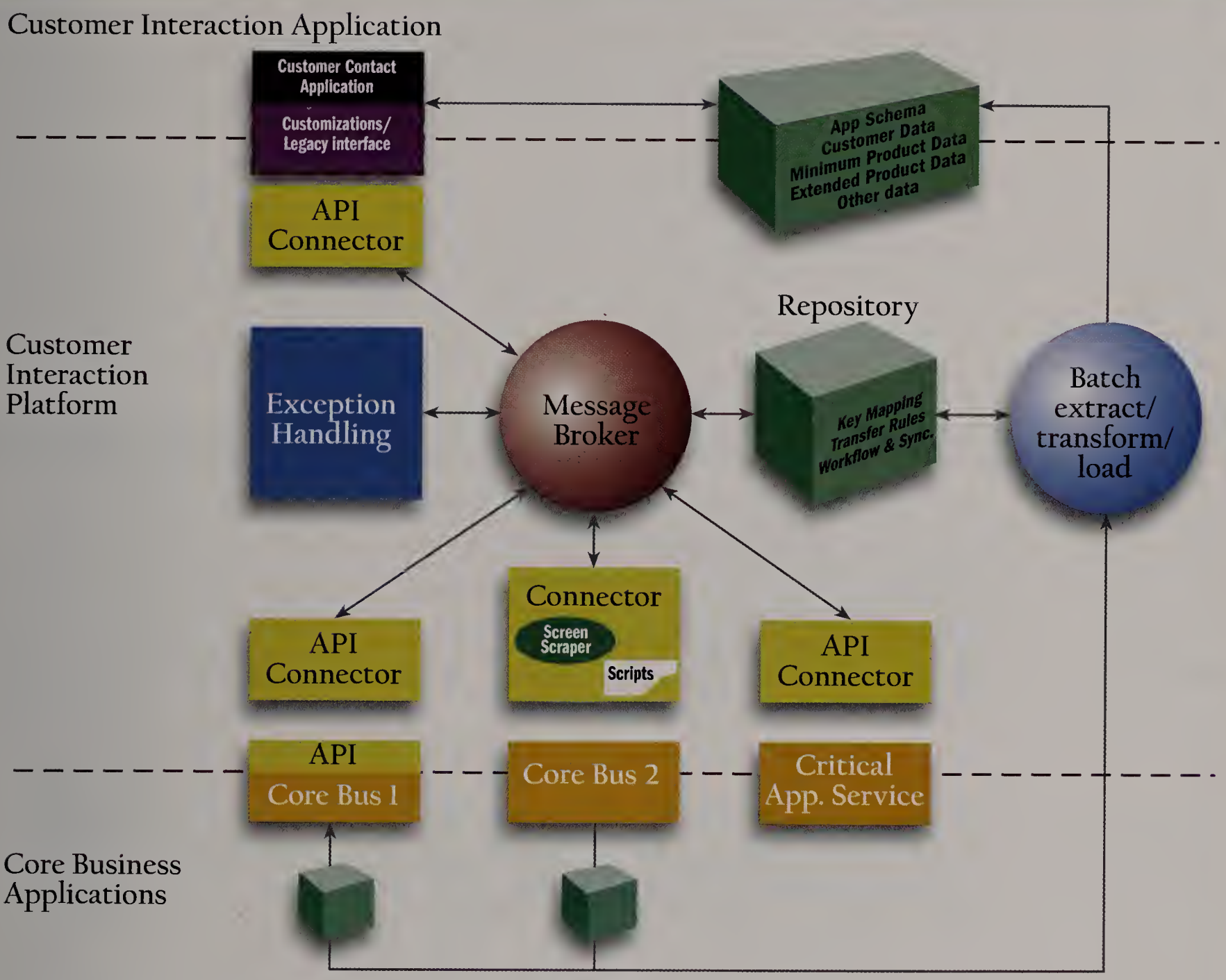
- **Scalability with Performance:** Sequent's NUMACenter provides a scalable Intel-based processor architecture. A mixed mode design is possible that employs a highly scalable UNIX data server with Windows NT application servers. This design utilizes the operating environment best suited for its function within the system. Based on the Intel Architecture, it also enables easier migration from UNIX to Windows NT at the data server level as a future deployment option.

  In addition to system scalability and performance, the Contact Advantage framework contributes additional performance benefits. The architecture supports the pre-fetching and caching of customer and product data records likely to be needed in support of transactions to multiple operational systems.
- **Availability:** The system architecture supports high availability at the software, processor and storage levels. For example, from a software perspective, middleware ensures the reliable delivery of data between the customer interaction platform and operational systems, as well as the customer information platform. Records of the most recent customer interactions can be queued (if the operational systems are not available) and then delivered to the operational system when it is running.

  In addition, storing the results of analysis in an operational data store eliminates the need to directly access the data warehouse during a customer interaction. This design ensures both greater overall availability and higher performance.
- **Integration:** The integrated architecture provides a single view of the customer, bringing the information together from multiple sources. From a systems integration perspective, Sequent acts as the prime contractor. This is a highly complex system from a software perspective alone, ranging from the call center application and its database, to the data movement programs and associated message-oriented middleware, to the data warehouse software and analytical tools, to the operational data store. And this doesn't include servers and storage properly tuned to meet system requirements. Sequent takes responsibility for testing and certifying the interoperability of the many elements of the solution.

The integrated architecture provides a single view of the customer, bringing the information together from multiple sources.

Contact Advantage: The Customer Interaction Platform



Source: Sequent Computer Systems, Inc., 1999

Figure 3

Case Study: A Major Retail Bank

In a time of industry deregulation, retail banks face increasing levels of competition. The new economic reality motivates banks to provide higher levels of service in delivering an expanded portfolio of financial products. The goal is to attain higher levels of customer loyalty while earning a greater share of each customer's overall financial business.

Sequent initially worked with a large retail bank, as part of its Decision Advantage program, to implement a comprehensive customer information system. Following this, Sequent worked with the bank, as part of its Contact Advantage program, to implement a system that used the analysis of customer information and a new telephone banking solution to create a more personalized relationship with the bank's customers.

The system is a powerful example of closed loop processing. Off-line analysis of customer transactions develops customer scores that are used to direct the dialog with a customer in the real-time environment. This is made possible by a pair of Sequent NUMA-Q 2000 servers that function as application servers running the call center application. Middleware developed by Sequent determines which branch of the script should be used in the current telephone conversation, by accessing the scores for that customer.

The telephone banking solution is an ambitious system that must be scalable, highly available and integrated:

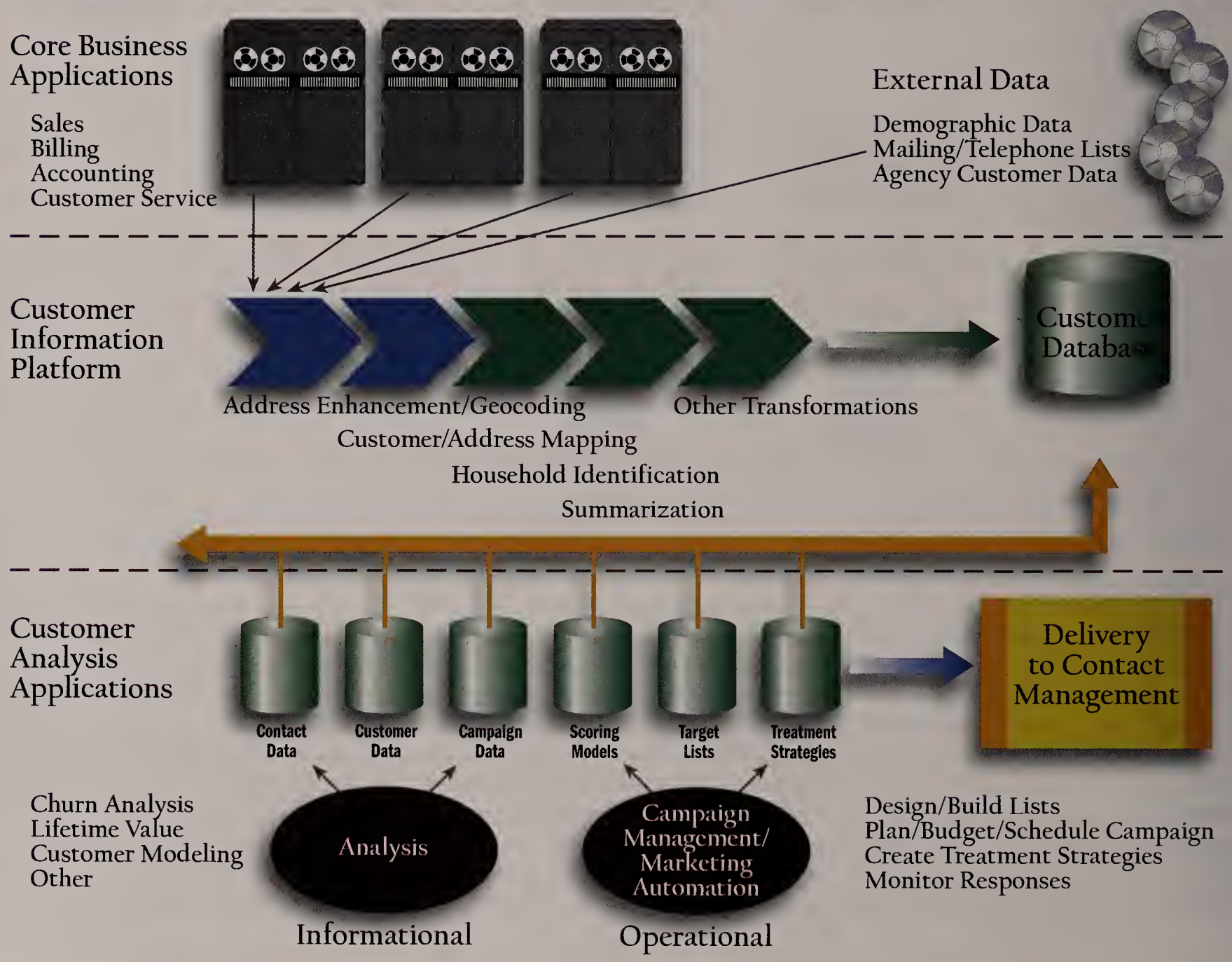
- **Scalability:** One measure of the reach of the system is the size of the customer information database—it contains 15 million customer records.
- **Availability:** The bank's call center must be available 24 hours a day, enabling customers to perform tasks ranging from account balance inquiries and paying bills, to statement requests and ordering new checkbooks.
- **Integration:** This is a complex system with many separate interoperating elements. The call center operational system must interface with the mainframe-based Core Banking System that maintains account information. The data warehouse pulls customer information from multiple systems in the bank and sends information from the analysis of customer data to the call center. The use of sophisticated middleware to manage the flow of data between the participating systems was essential in meeting the bank's goal that there be "no changes to the bank's existing systems."

The head of operations for telephone banking at the bank complimented the commitment of the Sequent personnel in a continuing relationship with the bank's IT group. He noted that "the Sequent people stand alongside the bank technical people" in supporting the design, implementation and enhancement of the system.

Snapshot Analysis: Sequent's CRM Solution

Enabling the implementation of systems that optimize customer relationships is a highly competitive space. Application companies, database companies, system integrators and system vendors are all converging on this field. Sequent will compete but also partner with these companies in order to deliver broad end-to-end solutions. There is currently no vendor with the technology to provide all the needed elements on its own.

Decision Advantage: The Customer Information Platform



Source: Sequent Computer Systems, Inc., 1999

Figure 4

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Sequent's customer relationship management solution—comprising Contact Advantage for customer interaction and Decision Advantage for customer information—boasts an advanced architecture that is aimed to maximize performance and availability of the end-to-end system. This is essential for a high-end customer service system such as the telephone banking case study. It will also be increasingly important for optimizing customer relationships in the Web-based electronic commerce environment.

MEETING AVAILABILITY GOALS

The velocity of information in a closed loop system is dependent on the degree to which there is a smooth transition from one phase of the cycle to another. Sequent automates these transitions by means of sophisticated middleware that ensures the delivery of data from end-to-end. The data flows from the customer interaction platform (underlying the call center in the retail banking example) to the informational platform and to the operational data store that can be accessed by the call center application in real time.

Techniques such as message queuing ensure that the data is delivered, even if the target system is temporarily unavailable. Sequent's design shows careful consideration given to which elements of the end-to-end system needed the redundancy and failover support for 7x24 availability. Clearly, this is required for the call center itself—where downtime means that a customer is not able to complete their banking transaction.

However, this degree of availability is not strictly required for the predictive modeling run on the data warehouse or the movement of the results to the operational data store. If the delivery of these results is delayed, the worst that happens is that the script branching is achieved via accessing the previous day's intelligence on the customer's overall pattern of behavior. If the business can tolerate such a worst case scenario, there is no financial justification for making these analytic elements as bullet-proof as the transaction processing elements. The design of a Sequent customer relationship management system appropriately maps the business requirements for availability to the level of technology required to meet the need.

CLOSED LOOP SYSTEMS FOR ELECTRONIC COMMERCE

Once companies invest in consolidating customer data for analysis, the results of the analysis need to be brought to bear on each type of customer interaction. The goal is maximum leverage of the information and a consistent and more personalized way of relating to a customer each time he or she is touched by the business. This includes Web-based and non-Web-based interactions.

IDC believes that the increasing use of Web-based electronic commerce will accelerate the demand for rapid exploitation of the latest customer information. The need for personalizing the interface presented to the consumer (based on the analysis of the data trail of previous interactions) will drive further demand for closed loop systems.

There are additional requirements for Web deployment, including personalized portals for presenting information and structuring the business-consumer dialogue. Sequent should look to extend the architecture to handle Web deployment, establishing partnerships with emerging e-commerce application providers and front office application leaders. The multi-tier design of Contact Advantage should lend itself to this type of extension. Future experience with Web-based implementations should enable Sequent to package more of the additional elements required.

IDC believes that the increasing use of Web-based electronic commerce will accelerate the demand for rapid exploitation of the latest customer information.

Conclusion

A customer relationship management system should combine transaction processing with the analysis of customer interactions, leading to the optimization of each interaction. Sequent has packaged software, hardware and services to deliver one of the most impressive closed loop systems available on the marketplace. There is a sophisticated data and processing architecture to ensure the scalability and availability of the total system. This support is critical in order to provide a robust system that brings the latest customer information directly to the point of customer interaction.

There has been much discussion about the benefits of closed loop systems, but few examples of such systems are in actual use. Yet Sequent's customer relationship management architecture is being deployed today in highly demanding settings. With careful attention to systems design and valuable delivery experience, Sequent can provide an integrated whole that is more than the sum of its parts. ●

Henry Morris directs research on data warehousing and information access software at International Data Corporation, a worldwide research firm with headquarters in Framingham, Massachusetts. He has written extensively on the increasing importance of analytic applications and closed loop systems. These enterprise optimization systems help businesses seeking to increase the efficiency of their core processes or to discover new business opportunities.

Dr. Morris has also published research on the technology choices made by enterprise application vendors in such areas as components, client/server architectures and support for data warehousing. He analyzes the emerging alliances of software vendors in related segments by building models such as the application ecosystem and the vertical warehouse.

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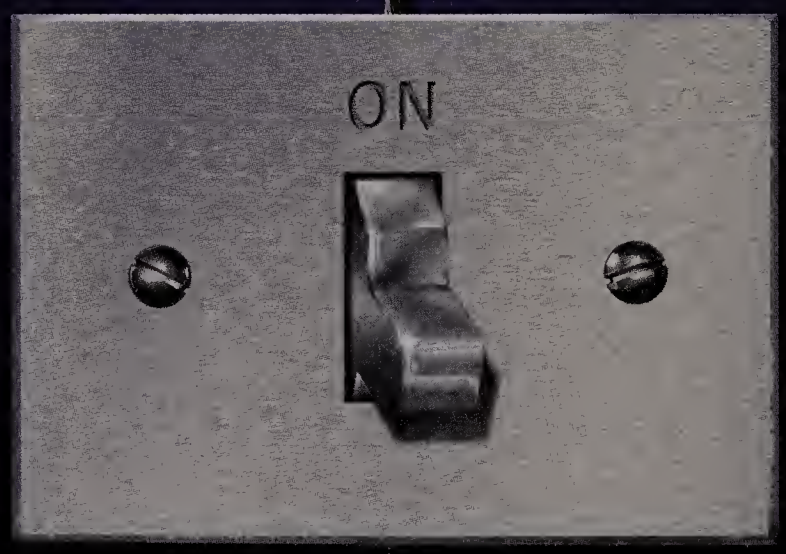

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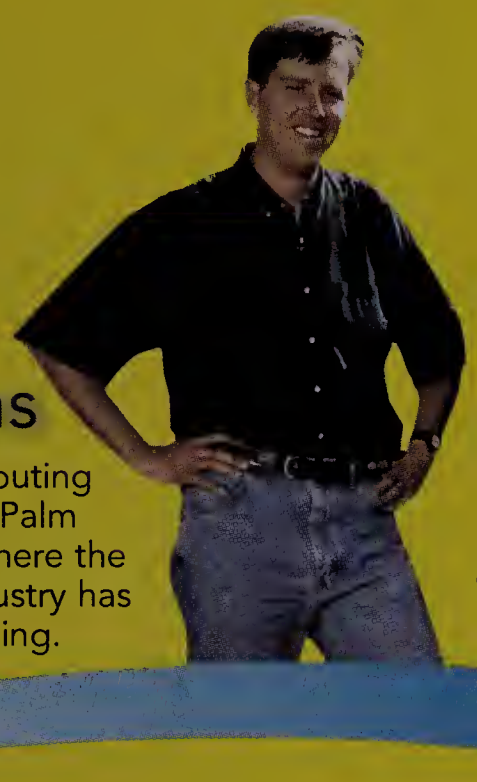
Bill Joy

Bill Joy delivers his and Sun's vision on wireless Internet & wireless data.

DAY 2

Jeff Hawkins

Founder of Palm Computing and inventor of all the Palm products, speaks on where the mobile computing industry has been and where it's going.



Jeff Hawkins
Chairman & Chief Product Officer, Handspring

DAY 3

CIO Roundtable

CIO Magazine and leading CIOs from around the country share their experiences with wireless data and which solutions were right for their enterprise.

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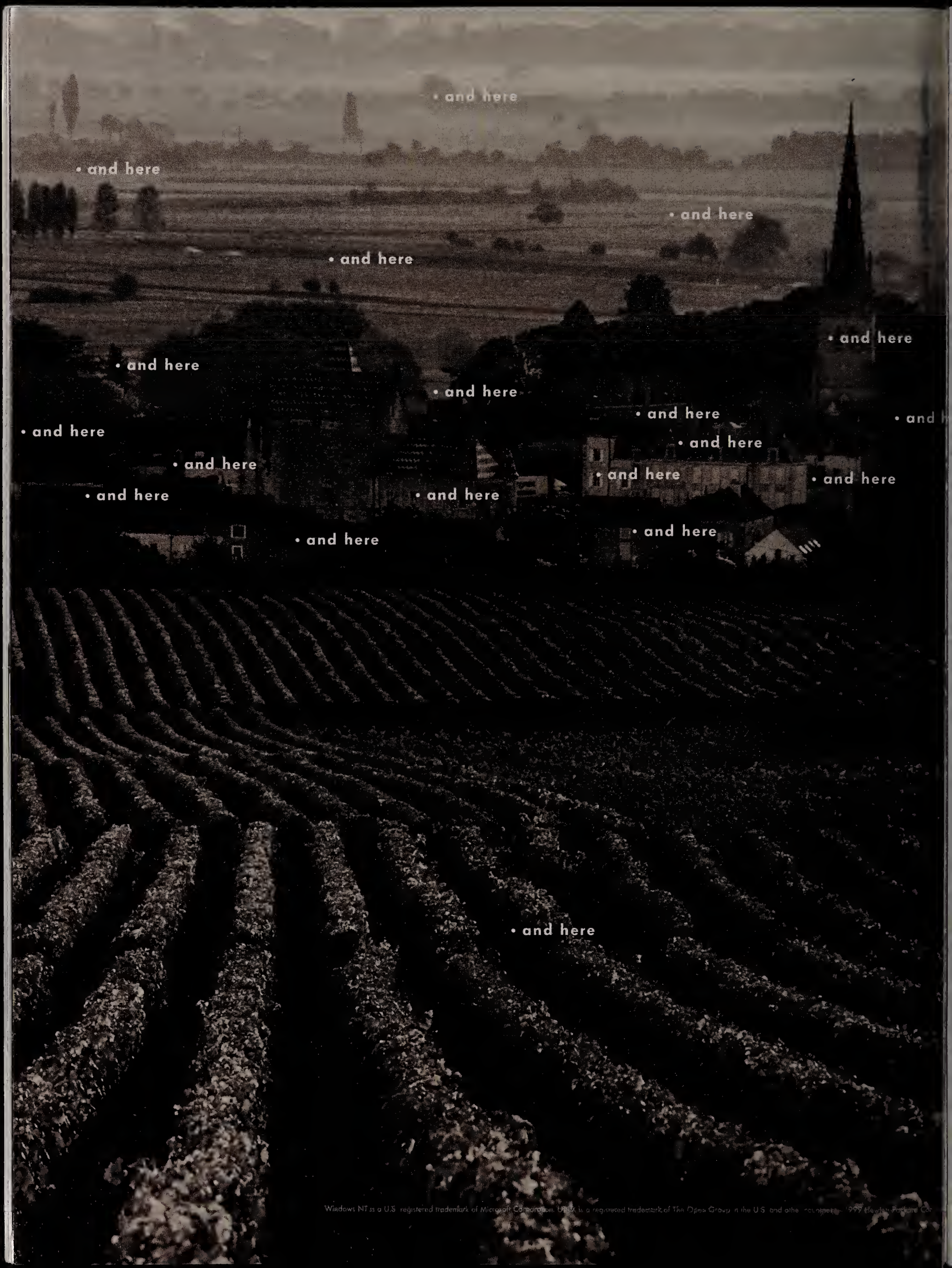
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Publisher's Note

An Open Letter to Judge Thomas Penfield Jackson:

As you prepare to hear final arguments in the *United States v. Microsoft Corp.* trial, I'd like to share my thoughts regarding the course of action you should take. While in Washington, D.C., last winter, I listened to an hour of testimony from a Microsoft executive. On the way to your courtroom I passed the chambers of Judge Harold Greene—who oversaw the AT&T case in the 1970s and early 1980s—and was struck by an idea. Most people agree that the Department of Justice adequately supported its allegations against Microsoft in the first phase of this trial. Those calling for the breakup of Microsoft or the release of Windows source code are misguided.

The events in your courtroom, combined with the pace of technological innovation, have already changed the face of Microsoft forever. Since the trial began, new technologies like Linux, the rapid consolidation of the cable industry, the increased deployment of bandwidth, robust directory services and the AOL-Sun-Netscape alliance have moved the center of the computing universe off the desktop. Anyone who thinks Microsoft can dominate the era of Internet computing is suffering from serious digital delusions.

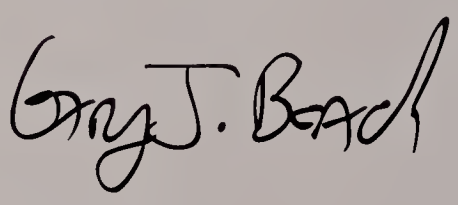
Microsoft itself has changed as well. For a company that has always touted its "great" people and its "great" software products, you need a scorecard to keep track of the senior executives who have left since the trial began. (Many of these executives were either directly involved in or responsible for the abuses highlighted in your courtroom.) I see new leadership coming up the ranks of Microsoft: These people are more customer-focused and more solutions-oriented than their predecessors, who often blatantly forced their ways on the industry.

Should Judge Jackson Let Microsoft Off the Hook?

Visit Sound Off! and join the debate at comment.cio.com.

So while it might be tempting to take drastic measures against Microsoft, I caution you against it. Instead, take a page from Judge Greene's playbook and issue a modified final judgment. Your MFJ would issue stern reprimands on Microsoft and create a five-person commission composed of IT users, hardware and software vendors and the DOJ who would report to you once a year for five years on Microsoft's business practices. Microsoft deserves this probationary action. The company and the millions of people who use its products do not deserve a drastic sentencing.

Judge Jackson, the settlement of this case has to be evolutionary. The idea outlined above maintains your strong influence in this case for the next five years and allows all sides to see if the chastened Microsoft and the forces of technological change can produce the best outcome: stronger competition and better products.



Gary J. Beach
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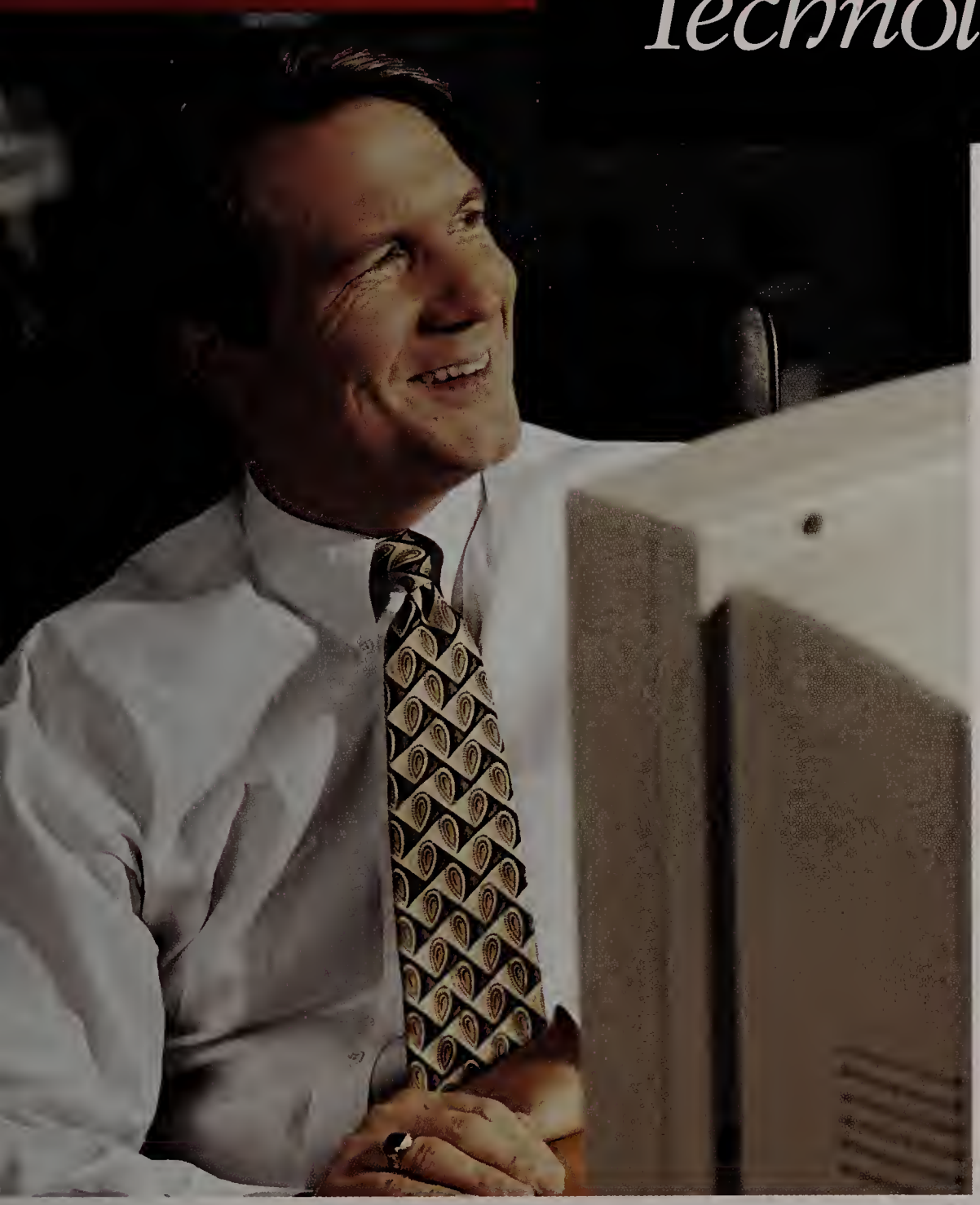

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Trendlines

NEWS, INSIGHT, HUMOR, REVIEWS

Edited by Sara Shay

Seeing Is Believing

VIDEO If, to coin a phrase, a JPEG is worth a thousand words, then the value of walkie-talkies just went through the roof. Kenwood Communications Corp.'s VC-H1 Visual Communicator amateur handheld radio—that's a walkie-talkie to you and me—includes a tiny camera and a video screen that can capture, transmit and receive snapshots. The battery-powered VC-H1 has a 1.8-inch color LCD display that is set into what looks like a transistor radio, with a speaker below and a podlike camera eye above. A single JPEG image takes about 17 seconds to transmit, so don't worry about your field agents using the VC-H1 to watch sporting events or any such thing. But it is quite versatile. It accepts input from other cameras or video devices and can even transmit directly to a personal computer equipped with the right software. Long Beach, Calif.-based Kenwood recommends the device for amateur radio hobbyists, camping trips, field days, even disaster communication teams. The VC-H1 is sold through dealers; to locate the dealer nearest you, go to *www.kenwood.net/contact.cfm.* ■

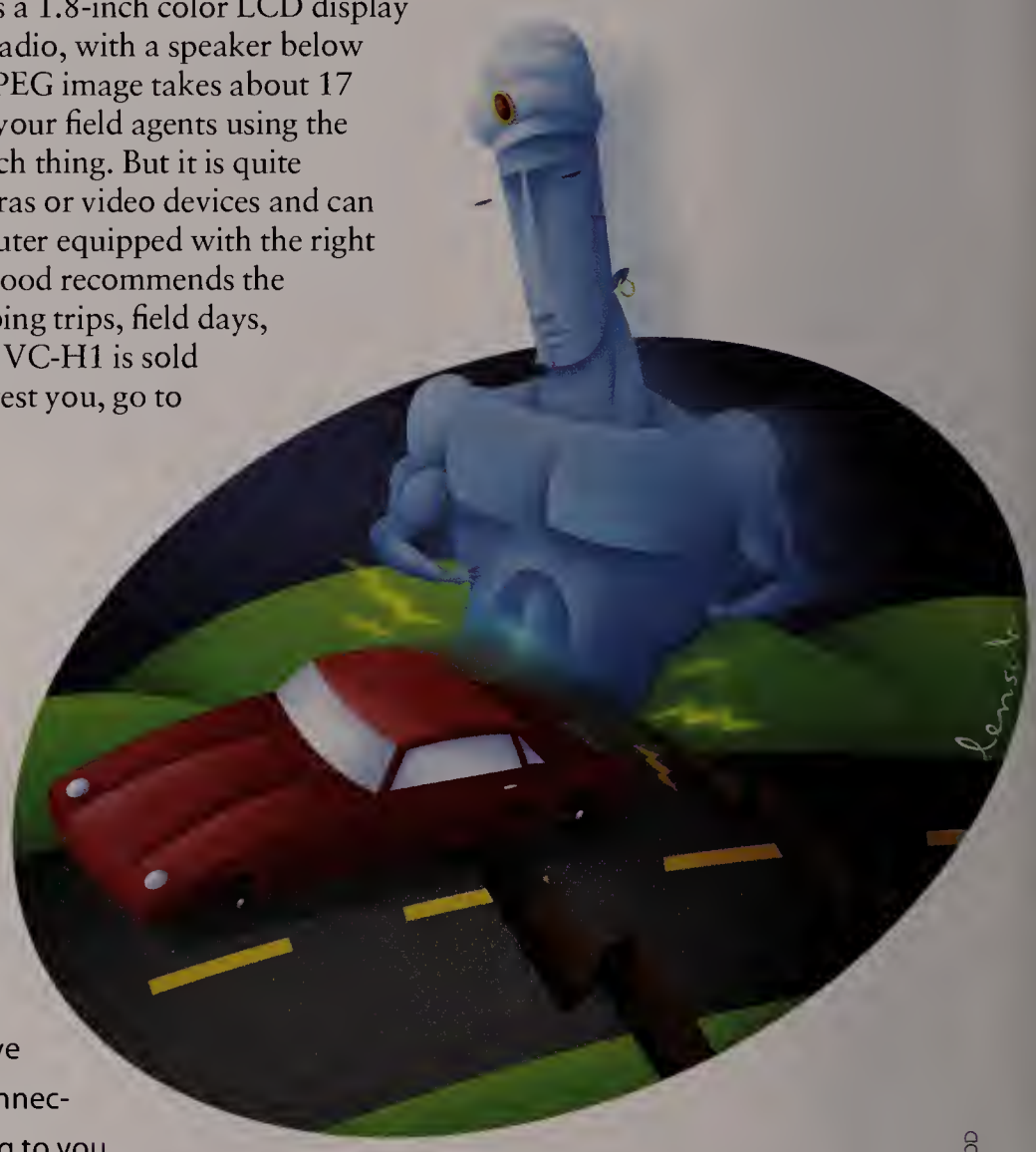

ILLUSTRATION BY CHRIS LENSCH; PHOTO COURTESY OF KENWOOD

Car Genies

TELEMATICS On the way to your hotel in an unfamiliar town, your car dies after plunging into an enormous pothole obscured by a puddle in the road. You could pull out your cell phone (provided you have one and it's in the car), call directory assistance and ask for the nearest garage. Or you could reach up and push a button above your rearview mirror and initiate a wireless connection to a service center. A trusty agent—talking to you through a microphone embedded in the windshield visor—figures out where you are and immediately dispatches a tow truck to the rescue.

For the past two decades, companies in the wireless market, such as Motorola Inc., Qualcomm Inc. and Trimble Navigation Ltd., have been researching the emerging field of in-vehicle computer technology, or telematics. Telematics provides two-way wireless communications services between a car and a service center through a combination of cellular technology and a global positioning system (GPS). Motorola's system, for example, includes a cellular console with three buttons: one for emergency assistance, one for roadside assistance, and one for navigation and concierge information. Analysts predict a healthy growth in the industry: The number of systems installed in cars was 56,000 in 1998 and will reach 181,000 by 2000, according to The Strategis Group, a Washington, D.C.-based telecommunications research and consulting company.

Originally developed for the *(Continued on Page 26)*

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Trendlines

(Continued from Page 24) trucking and commercial fleet industries in the 1980s, telematics began to appear in high-end consumer cars in the mid-1990s: Ford Motor Co.'s Lincoln was one of the first. In the future, software vendors such as Microsoft Corp. envision telematics as a way to make driving more entertaining and productive, with voice-enabled e-mail and video-on-demand for passengers. (Automakers are not delivering the Internet to drivers just yet, because it's dangerous to surf and drive and because digital wireless networks are too immature to handle Net traffic.)

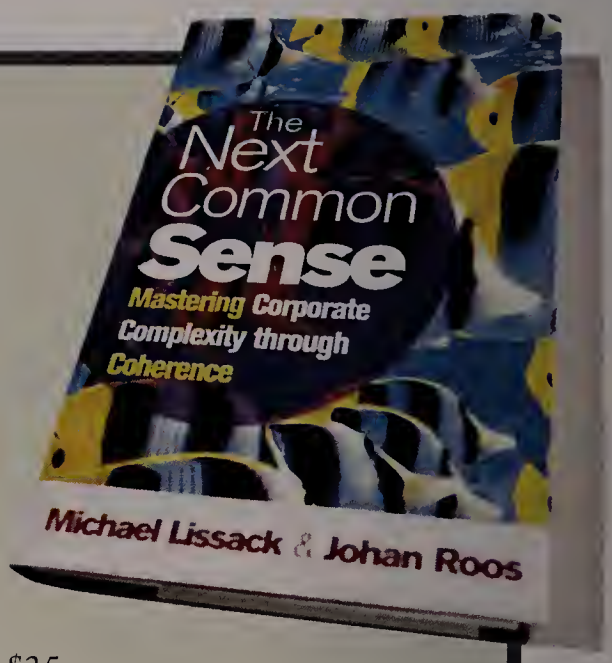
The technology is appealing, not just for its convenience but for its safety features, which include remote engine diagnosis and emergency response. If the pothole disaster had deployed air bags, for example, a sensor would trigger an automatic call for an ambulance.

The systems today are still pricey, adding from $700 to $2,000 to the cost of a new car, with basic service fees beginning at around $15 per month. However, the price for a basic telematics system will plummet to around $200 in five years, according to Stephan Beckert, a senior consultant with Strategis. Telematics is already finding its way into the average family car. General Motors Corp., for example, offers its OnStar telematics system (partially based on Motorola technology) in 31 different models—from the basic Chevy Lumina to the high-end Cadillac Escalade sport utility vehicle. If it can brew our morning cup of coffee too, we're sold.

For more on IT in the auto industry, see "Car Wars," Page 40. *–Polly Schneider*

Off the Shelf

Corralling Complexity, Fighting Frenzy



The Next Common Sense: Mastering Corporate Complexity Through Coherence

Michael Lissack and Johan Roos
Nicholas Brealey Publishing, 1999, $25

SOME DIVINE HOTSHOT HAS PUNCHED THE ACCELERATOR of time just to see how fast the world can go. What used to be a leisurely landscape is now a blur out of which competitors appear without warning. Everything is moving so fast that by the time you unclasp your briefcase to pull out the company manual, it's too late—the next challenge is looming.

So what rules do you apply to handle change in a complex world? According to Michael Lissack and Johan Roos, both of whom have extensive business and consulting credentials, you use common sense, or more exactly, *The Next Common Sense*. In a wonderfully rich expression of irony, they advise us to attack complexity with simplicity. The authors, in 12 clearly worded chapters, set forth 12 rules for companies to inculcate a corporate culture that heralds individual creativity. It's really that simple: In a world as complex as this, there's no way that top-down management directives can anticipate all situations or that a company can react if all decisions have to go through channels.

In psychobabble terms, the concepts they recommend are called "letting go" and "empowerment." Lissack and Roos recommend letting interactions take place, thinking about ecosystems rather than entities, and sending out what they call "scouting parties." The old common sense, they say, involves "sticking to your knitting." The book is peppered with examples of teams and workgroups that broke out of their boundaries to achieve greatness. Granted, Southwest Airlines Co. and General Electric Co. are not original examples, but their stories are worth retelling in the context of this high-speed world.

But how do you change a culture weighed down by its own inertia? The authors make it sound simple, and in a way it is: Reward creative behavior. Be open to new ideas. To use an old Republican bromide, stay the course. Hire the kids who are going to live in the future you create, and make the boomers acknowledge that not everything that worked in the past will work in that future.

This blueprint for tapping into the creative energy of every employee is also remarkable for its own accessibility. It's an exceptionally easy read, with examples and definitions broken out and guidelines repeated incrementally at the end of every chapter. No boring pedantic academics, these guys. They, too, use simplicity to conquer complexity. *–Howard Baldwin*

PHOTO BY VITO ALUIA

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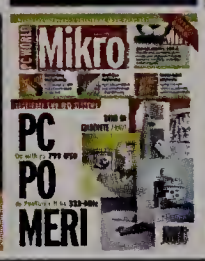

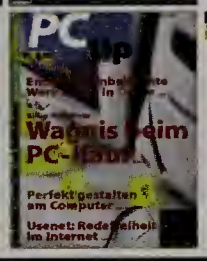

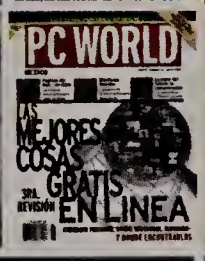

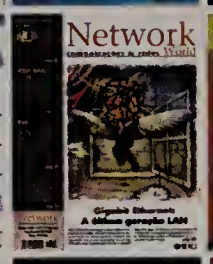

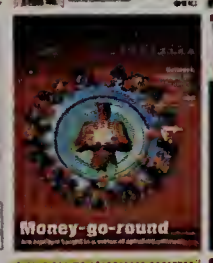

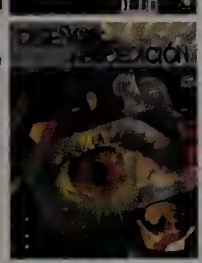

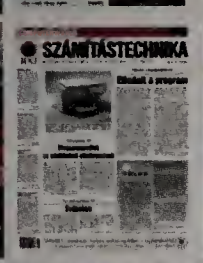

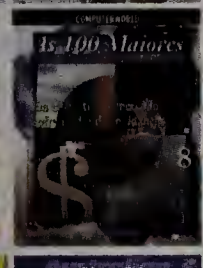

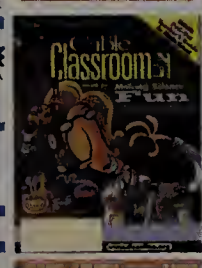

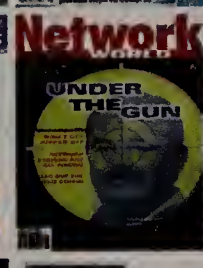

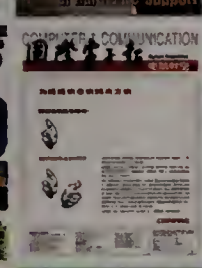

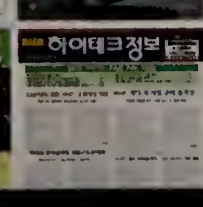

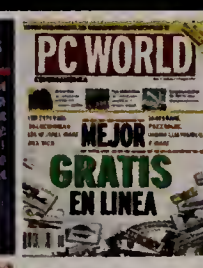

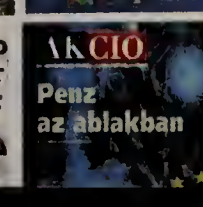

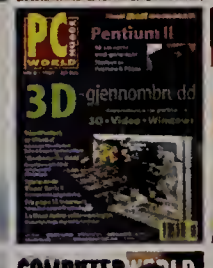

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Trendlines

"Wait, I Know a Shortcut..."

DATA RECOVERY Forget the Y chromosome. Everyone knows that the primary difference between men and women is that women possess the common sense to ask for directions when they're lost and men don't. A recent survey of the small office, home office (SOHO) market gives this old axiom a modern proof.

Ontrack Data International Inc., a Minneapolis-based data recovery services and software company, recently surveyed 1,200 SOHO computer users in conjunction with Working Solo Inc., a business consulting company based in New Paltz, N.Y. The survey, originally designed to root out the computer needs of at-home business users, uncovered significant differences in the way men and women value data and how they seek to recover it when lost.

More than 53 percent of the men surveyed said they never ask for help in recovering lost data, while just 29 percent of women would eschew assistance. Less than 14 percent of the men said they would turn to an outside consultant or retailer for help; by contrast, 26 percent of the women surveyed said they would contact an outside source. In addition, the men place more value on customer and client files, while the women view image and artwork files as the most valuable.

Joan Schimml, marketing communications and public relations manager for Ontrack, says she has no idea why these differences exist and adds that the company has no plans at this time to respond to the survey by changing the way it creates or markets it. We're hoping next year they'll compare how long it took the do-it-yourselfers and the help-seekers to get their systems back up and running. ■

QUOTABLE

Syndicated columnist Julianne Malveaux on PBS's *To The Contrary* summarizes her opinion of the year 2000 problem:

"If you were an idiot on Dec. 31, 1999, you'll be an idiot on Jan. 1, 2000."

Just a Phone Call Away

MARKETING They're the consumers a marketer's dreams are made on: about 39 years old, married, pulling in a salary of $62,600 a year and likely to own their own homes. That, according to *American Demographics* magazine, is how you'd describe the average wireless phone user. Another common characteristic, though, is that many users are too busy to read newspapers or watch TV, so they don't catch many ads. What's a marketer to do? Answer: Reach these elusive consumers where they spend so much of their time—on the road.

Chicago-based Cellular Linking has just completed beta testing of its new "wireless concierge" service, which makes it easier for cellular phone users to call for information about products they glimpse on billboards or hear about in radio ads, according to CEO Michael A. Nemeroff. Rather than require them to dial a whole phone number (11 or even seven digits can feel like a lot when you're pushing 80 on the highway) or remember the location of a store or Web site, the caller will see or hear a three-digit number that, when dialed, connects him or her to a central point and from there to the advertiser's call center. The service works with any carrier or cellular phone type and is free for callers—advertisers that use the service pay Cellular Linking per call.

The service is currently available in Atlanta, Chicago, Cincinnati, Columbus, Detroit, Miami and New York City. Cellular Linking has tested the service in 13 markets and is now tweaking its software and teleservices before launching it in additional markets this fall. ■

ILLUSTRATION BY CHRIS LENSCH

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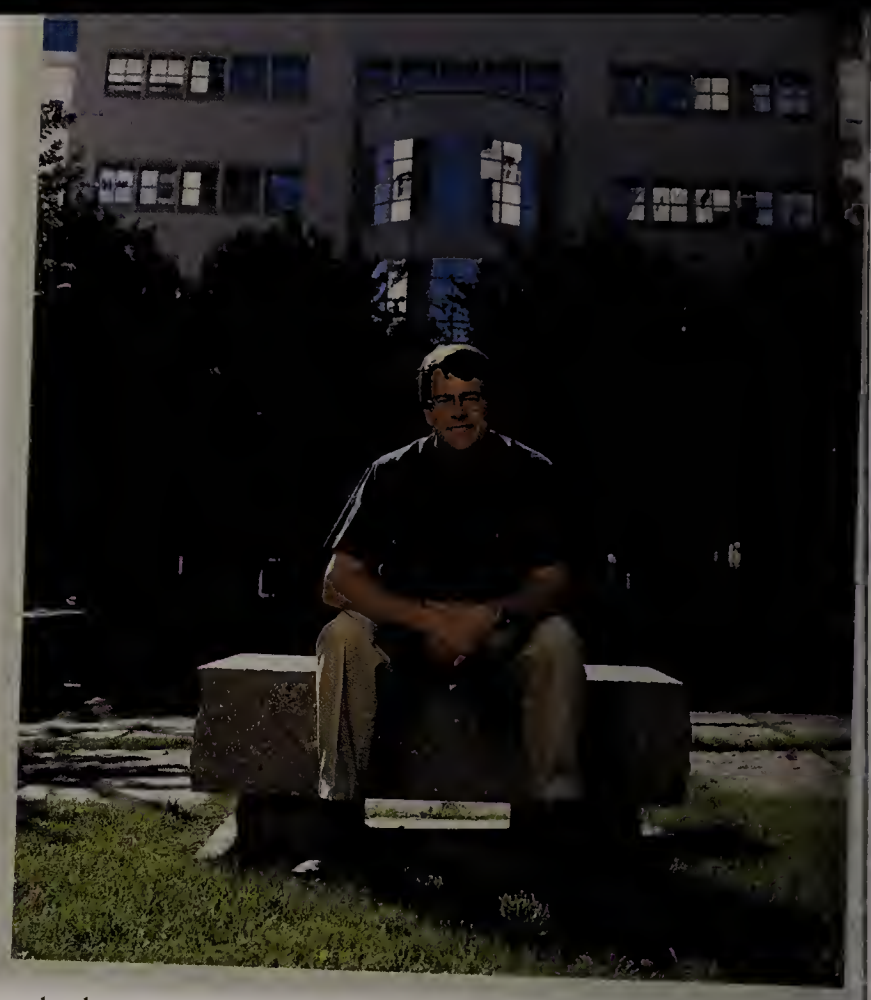
Trendlines

PC-Free?



Phil Hester, IBM

Q&A As desktop computers begin to go the way of cell phones and pagers—that is, the free stuff that comes along with one-year service contracts—we wondered what else is going to change in the marketing and use of that late 20th century icon, the PC. We asked Phil Hester, vice president of systems and technology, and chief technology officer at IBM Corp.'s Personal Systems Group, for his opinion.

Will the price of the PC go so low that no one will want to make or sell one?
No, but the business model is changing. As hardware costs continue to come down, the PC becomes less of the total buying decision than the services around it. As with cellular phones, you can now get a PC for free and you end up paying for it based on the services you use while accessing it. You and I have to decide whether we want 30 minutes of advertising shoved down our throats in return for 30 minutes of computing time. You're trading your time for the equipment. Businesses that want to reduce spending on PCs will have to decide whether employees' time is worth more than the advertising time in terms of lost productivity.

That decision isn't as simple as it may seem. You could argue that a PC with certain focused advertising could be a good use of someone's time in a business. In a purchasing organization, for example, if you had a collection of suppliers offering spot price specials for certain commodities that you need to buy, you might be able to argue that that improves the cost/productivity of your business as opposed to hurting it.

Will the PC continue to play the same role in companies as it has in the past?
We've been through three generations of computing—mainframes, minicomputers and PCs—and now we're entering the fourth: the pervasive device, such as cell phones with e-mail and handheld computers. It's interesting that each generation of computers does not drive the previous one out of existence but actually increases demand for it. Each generation becomes an information supply source for the next—a base that allows you to exploit the capabilities of the new generation of computers.

So is this a positive development?
As communications bandwidth into homes and businesses prepares to explode—by a factor of about 100 times what we have today—when technologies like DSL [digital subscriber line] come into wide use, the bad news is that the information clutter will be overwhelming. Agent technology, or deep computing technology, will emerge to help you find and filter the information that you care about and then perhaps get it to you on some of these pervasive computing devices in a manner that makes sense to you. The PC is the natural host for a lot of this technology that allows you to do deep searches. We have all this unused horsepower in a PC now. It basically sits there waiting for you to do something. PCs are going to start using those cycles to sift information while you work on your spreadsheet or word processor. The PC will become your personal agent that sends interrupts to you through cell phones and pagers to warn you that some important information just arrived.

–Christopher Koch

PHOTO BY WYATT MCSPADDEN

Linux Redux

SYSTEMS SUPPORT How hot is Linux, the open source operating system? No one really knows—even Bob Young, the CEO of software distributor Red Hat Inc. Last year, Young estimated the Linux installed base to be at "between 4 million and 10 million" users. That's about as useful as estimating that Mark McGwire will hit between 10 and 100 home runs next year. But while no one's really sure how many users there are, one thing is clear: CIOs want someone to call if and when their Linux apps hit turbulence. Indeed, the lack of consistent technical support has historically been one of the biggest obstacles to widespread corporate acceptance of the operating system (see "Free Radicals," *CIO* Section 1, March 15, 1999).

Today CIOs have a place to turn for help with Linux: Linuxcare Inc., a new company that provides Linux technical support for Fortune 2000 companies. Based in San Francisco, Linuxcare is building what it claims to be the largest knowledge base of Linux-related technical information for all hardware platforms; that information is available free of charge on the company's Web site at *www.linuxcare.com*. Service reps are also available to paying customers at a variety of prices and levels of support. Help for one business day, for example, runs $195 per incident; a 25-incident "pack" costs $4,144. Linuxcare was co-founded in August 1998 by Arthur Tyde, who also started the Bay Area Linux Users Group. Sounds like a man on a mission. ■

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A Clean Sweep

A pair of CIOs discuss the pleasures and pains of starting from scratch

BY DEBBY YOUNG

IN EARLY 1998 STEVE HASSELL, A seven-year Navy veteran, took on his toughest assignment yet, to be the new CIO of Newport News Shipbuilding and Dry Dock Co. in Newport News, Va. Later that year, 27-year-old Brian Feucht, who'd also done a stint in the Marines, became the first-ever CIO of Chicago-based Hire Quality Inc., a job placement company for service veterans. Two different individuals, two different jobs. Yet both cases offer insight into how enterprising CIOs can overcome organizational and personnel challenges to carve their own niches.

Starting Fresh

When he was named Hire Quality's CIO in September 1998, Feucht's goal was to turn a solidly manual company into an automated operation that could integrate more closely with its corporate clients. "I was very concerned about being promoted to a position the company never had before," shares Feucht. "No one in the company had ever set any expectations." His executive peers, some in their early 50s and 60s, had an innate mistrust of technology and scant understanding of how it could help the company move forward. But staffing costs were going through the roof, and senior management knew the company couldn't continue operating the way it had in the past. "The staffing industry has historically operated on the backs of envelopes forever," says Feucht. "But when you're talking about providing companies like United Parcel Service with upward of 2,000 job prospects a month, you need to have good automation or you just can't keep up."

First on Feucht's agenda was to dispel the widely held belief that IT was a hindrance more than a help within the organization. Prior to his promotion, computers were down a lot. End users didn't feel as if they were adequately supported by the poorly organized MIS department—a standalone group with talent but insufficient direction. What technologies the company did have weren't being implemented correctly.

But before Feucht could get executives to understand how technology could be a catalyst for change, he needed to establish a baseline infrastructure. In just three-and-a-half months, Feucht aggressively standardized the company's technology platform from a hodgepodge of standalone software and 60 different kinds of desktops to Dell Computer Corp. OptiPlex PCs and a Windows NT environment for all applications, messaging and Web site support. Then he directed his programmers to deliver some small but stable applications and quick fixes to a few critical business processes. "What it did," explains Feucht, "is it slowly built confidence that IT could support the business units in a way that they'd never been supported before."

In short, Feucht's little fixes have had some really big payoffs. He points to a 3,000 percent increase in productivity that occurred when his programming team automated the faxing

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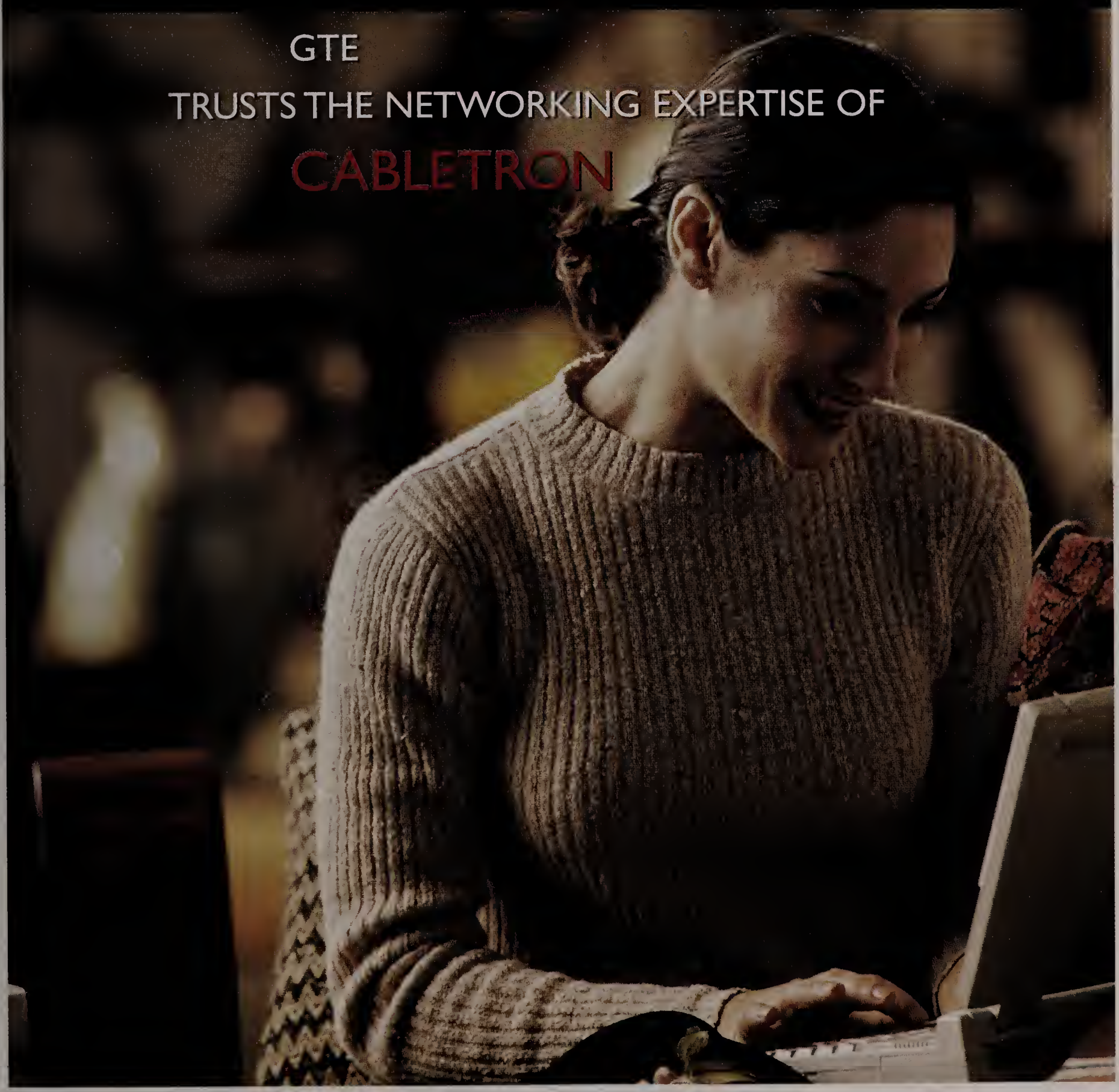

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process. It used to take a staff of seven to send 20,000 faxes a day. Now the information is centralized, and the faxing process automated and overseen by a single staffer.

By augmenting the company's Web site with key software, candidates now prequalify themselves for certain positions. The telemarketing staff spends less time reviewing employment opportunities with callers, saving Hire Quality between $5,000 and $6,000 a day.

And how has all this work paid off for Feucht? Well, he says his results have opened the eyes of senior business executives who previously viewed him as just the guy charged with bringing technology up to par with the business. "I don't think they ever thought technology would drive the business as far forward as it's done in the last year."

"I was very concerned about being promoted into a position the company never had before. No one in the company had ever set any expectations."

–Brian Feucht, CIO, Hire Quality

Building Alliances

When Steve Hassell was promoted from director of shared data environment implementation to CIO, he saw the move as an opportunity to redefine the role of the CIO within Newport News. "The previous CIO viewed himself as a technical problem solver," explains Hassell. "I tend to take everything from a business point of view."

And, boy, did he face some business problems. For one, the IS organization was more like a loose federation than a single, consolidated entity—there were IT workers spread formally and informally throughout the company like so many independent operators. No one department had the critical IS mass to solve a problem. Consequently, navigating through the information services bureaucracy was a nightmare.

"End users really hated us. It wasn't that they didn't like us or just thought that we were hard to work with—they really hated us."

–Steve Hassell, CIO, Newport News Shipbuilding and Dry Dock

"End users really hated us," Hassell recalls. "It wasn't that they didn't like us or just thought that we were hard to work with—they really hated us." Requests would disappear into an IT black hole, and users would never be told whether their requests were going to be handled or not. They would walk into a new facility holding their collective breaths, hoping that everything was in place to start the business day. Often it wasn't.

Tackling the problem head-on, Hassell created eight functional CIOs for each of these broad business areas within Newport News Shipbuilding: planning and scheduling; material and manufacturing; engineering; finance; human resources; aircraft carriers; submarine and ship repair; and information services. As one of Virginia's largest employers—more than 18,700 employees at last count—the company spread out over a lot of territory for IS to service, including engineering; production planning; assembly test and trade; materials and logistics; finance; aircraft carriers; and submarine and ship repair. The functional CIOs work with the vice presidents of those areas to consolidate and handle all their IS needs. "I've got the functional side doing most of the paperwork and supporting the user interface and keeping everything on track," explains Hassell. "This frees the applications development people to spend less time chasing down something and more time to focus on producing and delivering the product."

While Hassell acknowledges that it will take more than a few months to overturn a mistrust that had been building for years, he hopes that delivering a "boringly consistent level of performance" will help get IS out of the hole. He focuses his team's commitments to what IS can really deliver: cost-wise, time-wise and quality-wise. He also makes sure his functional and development teams keep the lines of communication open between the business units and IS.

"What was really driving our users nuts was the fact that they had no visibility as to what was going on," explains Hassell. Now IS sits down with the internal customer on a regular basis to review project status, assist with setting budgets, shift priorities if needs change and give business units a greater sense of control. "That [procedural change] alone has helped dramatically with the overall attitude toward us."

Hassell cites the movement of 1,000 engineers to a new facility as a case in point. The project involved laying out the entire infrastructure inside the new building, installing fiber-optic cables, and buying and setting up computers and all their associated programs. Hassell's team worked in concert with both engineering and the facilities department to address problems early on, reallocating staff when necessary to accelerate the project and meet schedule dates. The day the group moved into its new site, the technology was in place to support them. "That level of involvement in the move with them helped solidify the relationship," Hassell says.

Since that success, Hassell has noticed a shift in the way business units treat IS employees. They're starting to invite their functional CIOs to discuss options and strategies from the outset of a project. Hassell sees this step as a growing sign of confidence in his department's ability to deliver on its promises.

"I view my job as a business job. It is not a technical job," Hassell says. "My job is to understand the underpinnings of the business, then have an appreciation of how technology [can be applied to] those business problems." CIO

Debby Young, a freelance writer based in Framingham, Mass., can be reached at dscribe@erols.com.

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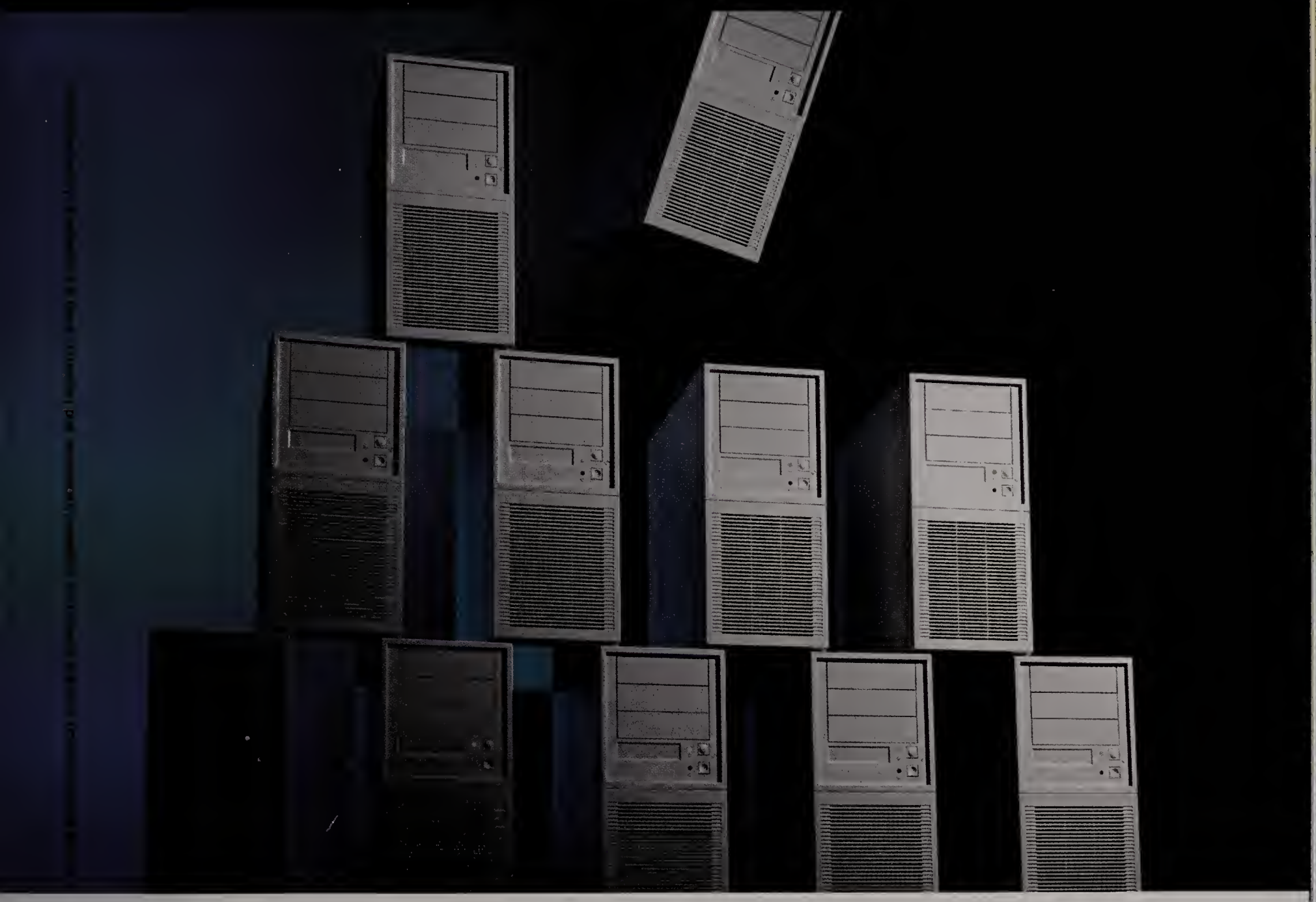

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Once upon a time, selling cars was a matter of personal relationships and negotiation. Then the Web arrived, and all that changed. Better buckle up: It's going to be a bumpy ride.

By Derek Slater

Scott Barrett sums up the auto wars like this: "Last summer another CIO told me, 'I just bought my new car from AutoWeb.'" So far, so bad for Barrett. He's the CIO of AutoNation Inc., a humongous corporation of car dealerships. But the plot thickens: AutoWeb doesn't really sell cars. It's a new Web-based business that helps consumers do online comparison shopping and then passes their contact information to local dealerships as a sales lead. "It struck me that [the other CIO] didn't buy his car from AutoWeb; he bought it from a dealer. But that wasn't his perception," Barrett says. And that's the kicker. "The last thing you want is to give up ownership of the customer." Ownership means customer loyalty, word-of-mouth advertising, repeat business, a continued revenue stream. When a customer decides to buy a new car, Barrett wants him or her to think, "Better head over to AutoNation"—not "Better check out AutoWeb."

This is a critical age for those who would sell cars. Not because people aren't buying vehicles; U.S. sales, as of midsummer, were widely expected to equal or break the all-time high (set in 1986) of 16.3 million cars and trucks in a year. No, the problem with the automobile industry,

Reader ROI

IT TAKES AN IRRESISTIBLE FORCE LIKE THE Internet to change an immovable phenomenon like auto retailing. Read this story to learn

- How the Internet is creating new businesses and business models
- How old-line manufacturers and retailers are changing in response
- How information systems forge uneasy links among the players

PHOTO BY STEPHEN WEBSTER

essentially, is the Web: A menagerie of new companies and new business models are crawling out of the Internet's primordial stew, upsetting the long-standing balance of power between car makers and car dealers. Forrester Research Inc., based in Cambridge, Mass., predicts that in 2003 the Web will influence roughly 8 million new car purchases, half a million of which will occur entirely online.

One vital common denominator among many of the Web auto companies is the allure of "no-haggle" shopping: See car, like car, like price, buy car—without inflated sticker prices and all that back and forth to the manager's office that some consumers regard as demeaning, dishonest and a waste of time. Of course, no-haggle pricing, like many other services touted by online auto players, requires cooperation from the brick-and-mortar folks who ultimately make, deliver and service that car. So on the one hand, the new online auto industry players are seeking partnerships with dealers and manufacturers alike. But on the other, the issue of customer ownership lurks in the back of auto executives' minds and renders those partnerships, in many cases, uneasy at best. The question of who owns the customer has festered in the auto business for a long time, so the rise of the middleman is picking at old sores. And as in every other industry invaded by the Internet, the old guard is re-examining everything from the smallest details of their operations to their very business models. "They can see that the iceberg is there; the question is, can they turn?" says James McQuivey, a senior analyst at Forrester and author of a report titled "New-Car Buying Races Online."

> "The last thing you want is to give up ownership of the customer."
>
> SCOTT BARRETT, CIO, AUTONATION

RISE OF THE MIDDLEMAN

Wasn't the Web supposed to be an agent of disintermediation? In the car business, new intermediaries are popping up faster than kids at the sound of the ice cream truck. AutoWeb (*www.autoweb.com*), for instance, provides all kinds of information for the car shopper, like prices, Kelley Blue Book values, recall and service bulletins, and reviews. Ultimately the company site seeks to record the customer's identity, location and purchase preferences, then pass this information along to participating dealers in the customer's local area. Such companies are often called lead generators. Other sites such as CarMarket (*www.carmarket.com*) function more along the lines of newspaper classifieds, or simply provide information for comparison shopping. Some sites rely on ad banners for their revenue, while others collect fees from either the dealers or the customers.

According to Barrett, AutoNation's CIO, consumers who use the Web as part of their car purchasing process fall into two fairly distinct groups. One group wants the convenience of being able to do some comparison shopping without having to drive from dealership to dealership. The other group is looking to avoid the negotiation process that has for so long been the standard way to do business for car salesmen. Online businesses do a good job meeting the expectations of the first group, but the "no-haggle" promise is much tougher to deliver. "Once they got off the Web, they were getting pulled back into the traditional haggling process," Barrett says—a result of a disconnect between the online businesses and the dealerships to which they forwarded their leads. In fact, Barrett asserts that he's seen research indicating that Internet buyers actually have lower satisfaction levels than do the customers who go through the normal channels. (Forrester's McQuivey, however, disputes that conclusion, saying that many dealers have "gotten a handle" on meeting online shoppers' expectations, which, he adds, are likely to be higher in the first place because they are armed with better information about their possible choices.)

Autobytel.com, AutoWeb, CarPoint and Cars.com all follow a business model that bridges that gap. Autobytel.com Inc., founded in 1995 and based in Irvine, Calif., has signed up a network of nearly 3,000 accredited dealers, representing most major auto brands. A consumer visiting the Auto-

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bytel site can click a few buttons to indicate the sort of car she is looking for—passenger or SUV, perhaps under $25,000, preferred manufacturers (if any)—and call up a list of matching vehicles for comparison purposes. Once the buyer decides on a particular model, she submits a purchase request online, and the site passes it to the closest Autobytel-accredited dealer, who looks at the specifications and calls the buyer with a price quote within 24 hours. Autobytel recommends that its dealers establish a separate "electronic sales" department to handle all Web-based leads, since buyers who come in through the online channels have a different set of expectations from those who walk in the front door. Autobytel provides onsite and offsite training for dealers' dedicated sales managers as well as for sales directors, receptionists and anyone else necessary for getting the online customer directed to sales personnel trained to deliver on the "no haggle, no hassle" promise. "Some of the lead generators advertise 'no haggle' on their sites, but then they send the customer to multiple dealers," says Ann Delligatta, executive vice president and COO of Autobytel. "I don't know what they expect will happen on that end." Clearly, the competitive element puts the likelihood of negotiation back on the table.

Delligatta's background underscores the fact that for the middleman, truly no distinction exists between the business and its technology. She was hired two years ago as chief technical officer; now she runs the company's operations. Generally speaking, the race among the middlemen is to establish the broadest range of services. Autobytel does not have this space to itself by any means. Even Microsoft Corp. is in the game with its CarPoint site, which, like Autobytel, advertises a network of trained dealers to back its informational services and no-haggle shopping. When the winners and losers are decided, "I think the straight lead generators will be a piece of the fallout," Delligatta says. The winners online, she believes, will be the companies that do the best job of meeting customer needs all the way through the buying cycle and beyond. "The cost of aggregating consumers to the site will be more than they can bear unless they can offer the consumer many more types of products and services online."

> "Manufacturers should be on the phone with me, figuring out how to get their information in front of customers on my Web site."

ANN DELLIGATTA, EXECUTIVE VICE PRESIDENT AND COO, AUTOBYTEL.COM

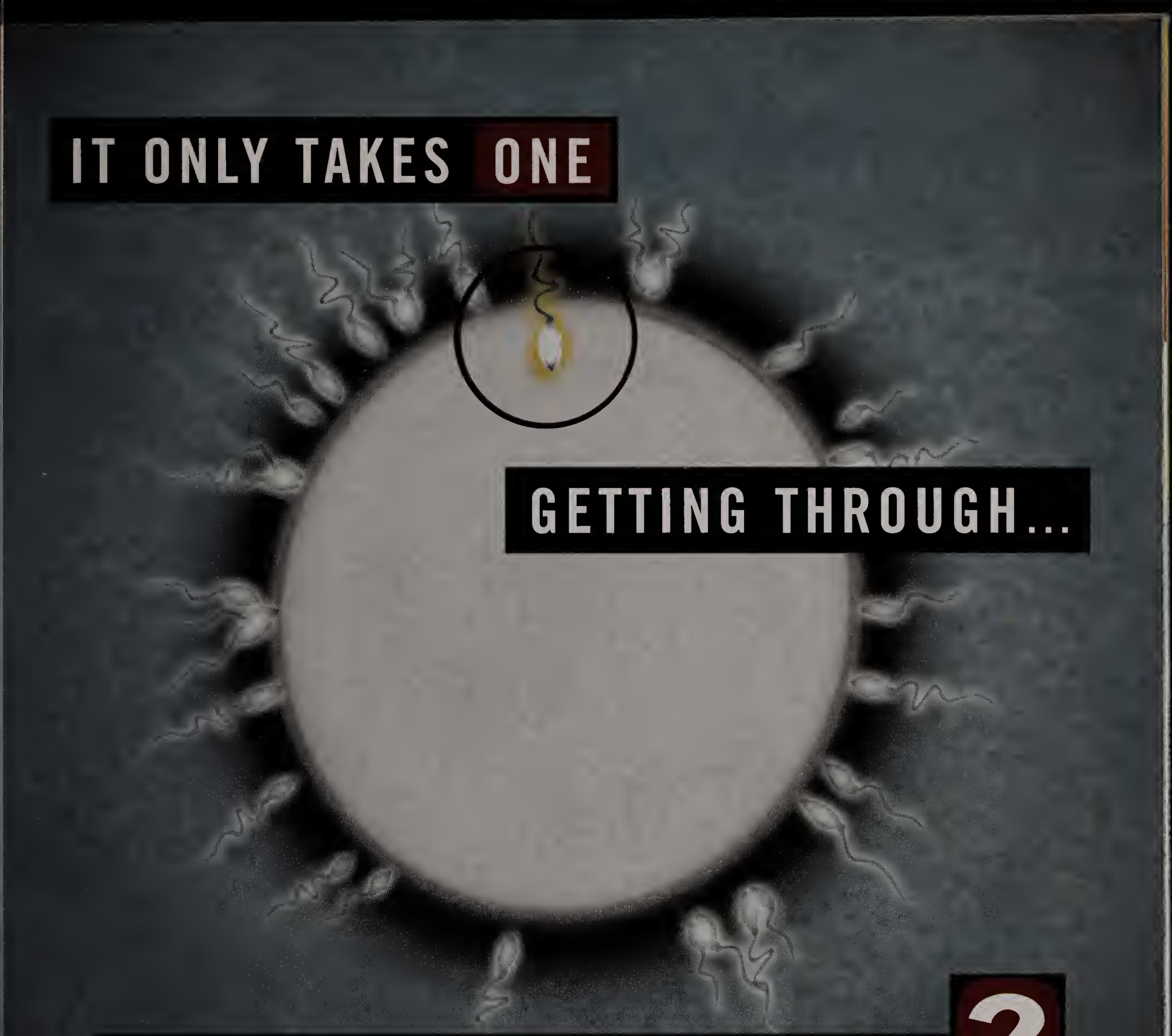
Autobytel garners its revenue from ad banners on its site and from dealer fees and related consumer services such as financing and maintenance. Is this an Internet business model that will succeed? The jury is out. Autobytel claims to have the highest brand recognition among Web auto sites, yet as of the first quarter of '99, it was still unprofitable, losing roughly $6 million against revenues of $8 million during that quarter. The company is currently racing to broaden its portfolio of services. For example, Autobytel recently began hosting auctions of used and wholesale vehicles on its site.

But building an online business depends as much on relationships with dealers and manufacturers as it does on adding site functionality. Some of the dealers have been collaborating to figure out how to build the online business, Delligatta says, although "there are dealers who are second- and third-generation auto industry who definitely think they know the way it is supposed to be done." Manufacturers have also been difficult; those relationships Delligatta describes as "evolving. Those are the big guys who are used to controlling things." If the car makers are indeed holding back from relationships with the middlemen, they could be in for an unpleasant surprise. "We're selling a lot of cars—a million dollars an hour. [Manufacturers] should be on the phone with me, figuring out how to get their information in front of customers on my Web site," Delligatta says.

DEALERS RESPOND

Dealers also have some reason to believe they hold a few cards that will always keep them in

PHOTO BY KAREN MILLER



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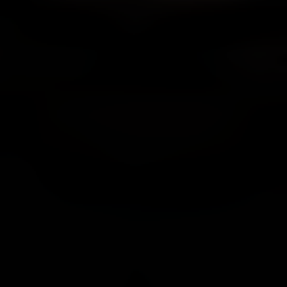

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the game. Car buyers can swap as many electrons as they like online, but eventually they want to go pick up an actual car. And cars need maintenance, which means the customer wants convenient and excellent service, for which many are accustomed to relying on their dealers.

Still, smart dealers are finding ways to join with intermediaries rather than resisting or ignoring them. AutoNation's response has come in stages. First Barrett and the rest of the company's management team sifted through industry research to determine what, exactly, the online shopper is looking for. Then the company set about ensuring that each dealership in the chain has its own Web site that is connected to the central AutoNation site. AutoNation, based in Fort Lauderdale, Fla., has more than 400 new-vehicle franchises—representing 36 brands—plus 40 used-car superstores. (The company also owns the National and Alamo car rental businesses.) The IS team established a template that allows new functionalities to be added to the central system and rolled out quickly to individual dealer Web sites.

"Customers want to go and test drive, see the colors in the daylight..."

BERNARD MATHAISEL, FORMER CIO, FORD

More ambitious, though, is AutoNation's new Web-based Compass system. Compass is the company's way of tying it all together, says Barrett. The company has established relationships with a number of online lead generators. Compass combines contact information from those sites with leads from AutoNation's own Web presence (*www.autonation.com*), hundreds of dealer sites and a new Internet sales site (AutoNationDirect.com) in a single database, and then acts as a prospect management system. The Compass system alerts sales staff in the appropriate AutoNation dealership, via pager, as soon as a new lead arrives in the database; then it walks the sales force through each step of the sales process, recording and time-stamping every contact with the customer, whether by phone or by e-mail. Barrett says research indicated that fast response time was a critical customer expectation. Initially AutoNation averaged 1.7 hours to contact a new customer lead; its goal is to pare that down to one hour. The system also provides management with the ability to measure the quality of leads—based on actual sales generated—from each source and from the company's own sites. "They can see transaction volumes in real-time. It's a great tool for managing the entire sales process," Barrett says.

AutoNation is unusual in several respects. For one, it is at the forefront of dealers responding to the Web-based changes in their industry. The many others who are unresponsive at this point will either change or be swept away. Another unique aspect of AutoNation is its size. It is a big chain of dealerships in a world still mostly dominated by small, independently owned dealerships. That size becomes critical when funding complex projects like Compass—as well as AutoNationDirect for selling directly over the Web, which AutoNation began doing last June. So whether the middlemen turn a profit (which some eventually will) or morph into some as yet unforeseen next incarnation, AutoNation has eggs in other online baskets.

THE BIG BOYS

It will be a huge step forward, however, if and when AutoNation is able to tie the manufacturers as well as the middlemen into the Compass system. "The lead providers are small, nimble companies, and it was easy to establish links from them into the Compass system," Barrett says. But manufacturers are having some difficulty figuring out how to respond to the new players in their sandbox.

The motivation appears to go back to the issue of customer ownership. Car makers are working to transform themselves into consumer-focused companies, and the Web is a great channel for facilitating that change. At the same time, manufacturers naturally want to exert their brands' influence no matter what channel customers come through; they don't want to drop everything they've accomplished in building a loyal customer base just because the Web showed up. "This is a

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very complex industry. An electronic customer interface [is important], but most [consumers] want to do a lot more than electronic shopping," says Bernard Mathaisel, formerly executive director and CIO at Ford Motor Co., based in Dearborn, Mich. (Mathaisel, Ford's first CIO, left the company in July. He is now corporate vice president and CIO of Solectron Corp. in Milpitas, Calif.) "Customers want to go and test drive, see the colors in the daylight, sit in the back seat, imagine how much luggage they can put in the trunk," he notes. That fact lobbies for the continued existence of the tried-and-true manufacturer-dealer relationship.

Mathaisel also asserts that Ford's Web site (*www.ford.com*) gets more hits (about 5.4 million per day) than the very largest of the "ecumenical" sites that provide information about cars from all manufacturers, and it continues to add functionality to its Web site to maintain this edge. Mathaisel also notes that manufacturers are privy to some information that third parties cannot provide. For example, custom ordering a vehicle is tremendously complicated (which power trains fit with which chassis?). There are roughly 1.2 million possible buildable combinations in Ford's Taurus line alone. Ford uses its knowledge about these combinations to determine whether it can match a given customer's design requirements. And only the manufacturer can provide accurate tracking of the completion and delivery date of that vehicle.

The Name Game

Got a great domain name for a new Web-based car business? Too late! These are already taken:

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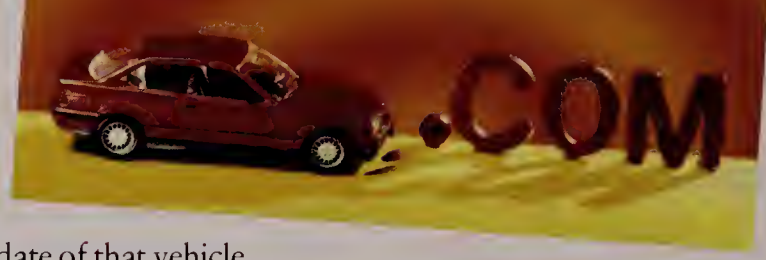
- autobuyer.com
- autobyinternet.com
- autopedia.com
- autovantage.com
- carbuyer.com
- carsforsale.com
- carshopper.com
- carsnow.com
- newcars.com
- usedcars.com

–D. Slater



"If I were one of the third parties, I would be very concerned about my future. They had a short time when consumers wanted electronic brochures. [Now] consumers want to do a lot more than that—they want to [custom] order the vehicle and track its delivery. The only place to do that is through [manufacturers and] dealers," Mathaisel says.

On the other hand, Ford President and CEO Jacques Nasser, who is relentlessly pushing the $144 billion giant to become a consumer-oriented—rather than product-oriented—company, sounds more receptive to the Autobytels of the world. "I've welcomed the Web-based businesses," Nasser says. "Are they causing some rethinking and change? Yes, and I think it's very positive for Ford." Having said that, Nasser does not specify the ways in which Ford will work together with Web intermediaries in the future; time will tell whether Mathaisel's replacement as CIO, 25-year Ford veteran James Yost (whose full title is vice president of process leadership and CIO), will build bridges or burn them.

Meanwhile, Ford seems to be trying a little bit of everything, selling used cars online and experimenting with new retail formats like its "Auto Collection" superstores that house all of Ford's numerous brands (Ford, Lincoln, Jaguar and soon Volvo, among others) under one roof.

STAY TUNED

So the three parties—manufacturers, dealers and middlemen—are circling each other warily, offering to shake with their right hands while still keeping a dagger handy in the left. Who will be left standing, and how will they be interconnected, when the dust settles? One inevitable event will be a shakeout among the online businesses. "The good news for these referral services is that they are the dominant show on the Web, compared to AutoNation-Direct.com and other dealer sites," says Forrester's McQuivey. "The bad news is that with so much competition, they match each other feature-for-feature, and it's very hard to see any profits for them any time soon." Whichever of these new businesses survive the shakeout, the confrontational edge in the industry should dull over time. In an ideal world, all three parties—makers, middlemen, dealers—would cooperate to provide a new level of service and convenience to the consumer.

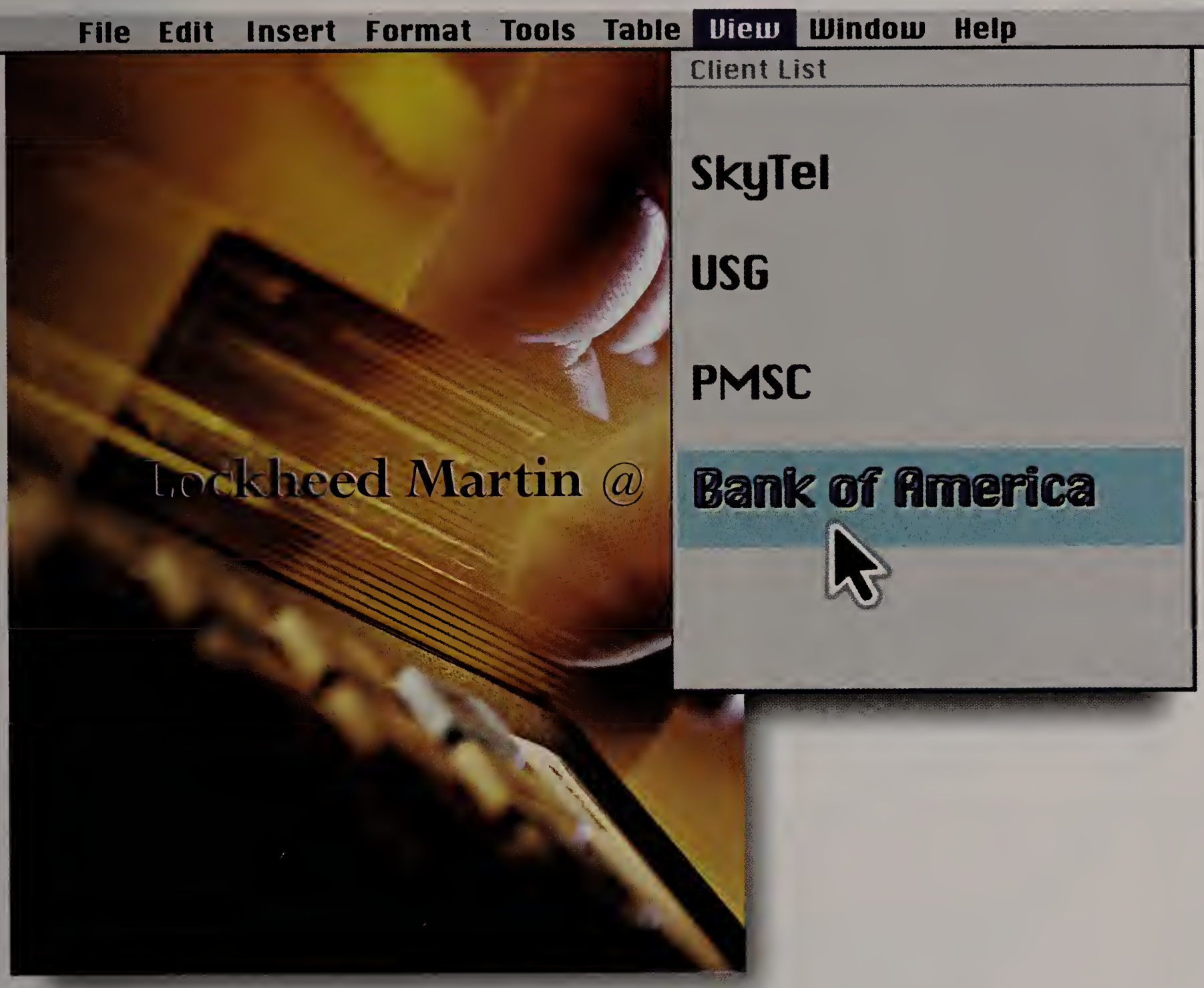
And the power of consumer choice will push them to it. Ironically, all this jockeying to own the customer may be in vain—in an age of instant comparison shopping, customers will not care to be owned. They will still have favorite cars, favorite dealers and favorite Web sites, but their allegiance will be harder to maintain than in the past, and customer ownership will be shared—if there is such a thing at all. "If they're spending time wondering how to own the customer, they're thinking about the wrong thing. With this much information available to consumers, owning the customer is not a reality," says McQuivey.

Or, as Delligatta puts it, "In the Internet economy, it's the consumers who are in the driver's seat." CIO

Senior Writer Derek Slater can be reached at dslater@cio.com.

PHOTO BY STEPHEN WEBSTER

MISSION: When Bank of America invested in new technology, they knew success required that people could use it. But how? Traditional training was too slow; hiring new employees too expensive. Lockheed Martin's solution: a business-smart process called reskilling. It uses real projects to teach new skills, guided by experienced coaches.



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SUCCESS: Reskilling did more than train people to run computer systems; it taught people to rethink how they used those systems. The result: competitiveness sharply higher across the company, and a workforce with lower turnover. To see what Lockheed Martin IT expertise can do for you, visit www.lockheedmartin.com.

Measuring Up

Successfully juggling all the elements in complex IT projects takes more than experience and gut instinct. It takes metrics.

BY LYNDA RADOSEVICH

Ask Debra Domeyer about the importance of good IT project measurement programs and she'll tell you about a disaster narrowly avoided.

In the early 1990s Domeyer inherited a financial application development project where the project team was extremely busy accomplishing little. The project, at a mortgage consolidation company, was rudderless, lacking a solid project plan, an authoritative project manager and good tracking measures. There were more than a dozen people at the first planning meeting Domeyer attended but no clear decision maker, and the project had a marathon-length scope creep.

"It had become a financial system that would also brush your teeth and make your bed in the morning," says Domeyer, who is now CIO of

Reader ROI

A HANDFUL OF HIGH-LEVEL METRICS can help CIOs track large projects and improve business performance. In this story, you will learn

- Which measurements are crucial to keep IT aligned with business goals
- Which metrics should be part of your project plan
- Best practices in applying project metrics

ILLUSTRATIONS BY JAMES YANG

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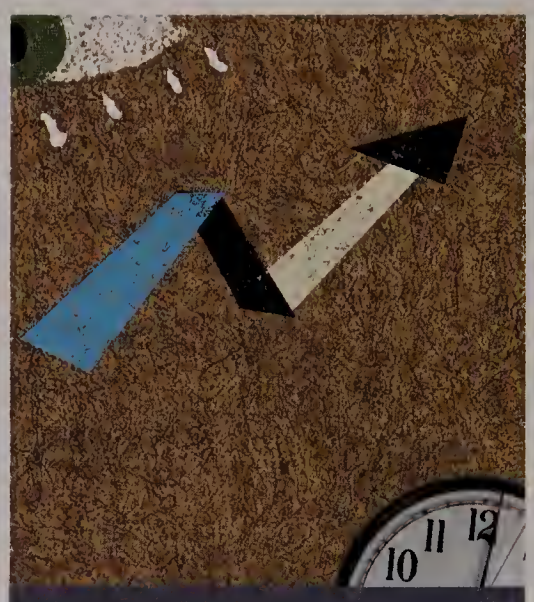
PG&E Energy Services in San Francisco.

After that fateful first meeting, she estimated that after five months' work, the project was only 5 percent complete. Given the anticipated spending rate and delivery speed, the new financial system would cost more than $1 million and take at least two years to complete. She reviewed the numbers with her CFO and other senior executives, who quickly agreed to kill the undertaking. Domeyer then launched a new project with strict time, cost and function requirements. She installed upgrades to the existing financial software package and met the most pressing business needs in four months—all for roughly $140,000.

A good project manager is the most important tool for successfully delivering a complex IT project, but even the most knowledgeable manager needs more than experience and gut feelings to close intricate IT implementation projects successfully.

Enter metrics. Not the European decimal system, but the discipline of instituting measurement programs to keep projects on schedule. Metrics can track everything from programmer productivity to business value. While it seems like common sense to measure a complex IT project's progress systematically, most CIOs bury metrics beneath all the other demands on their time. In fact, in a 1999 study of IT managers in 6,000 companies spanning major industries in 28 nations, Rubin Systems Inc., a consultancy in Pound Ridge, N.Y., found that only half the respondents actively use metrics. Of these, only one in 25 collects and uses them on a weekly basis. A few more use them monthly—one in 10. Some get to it maybe once or twice a year—about one in 100.

This reluctance and outright rebellion against metrics has a base of support among those who believe that such programs do little more than send up red flags when a project is in trouble. "You can talk metrics until you're blue in the face. And although they may tell you whether you are on, behind or ahead of schedule, you still don't know if you've got any hope of catching up or of limiting your collateral damage," says Neal Whitten, author of *Managing Software Development Projects: Formula for Success* (John Wiley & Sons Inc., 1995).



Most project *managers* are *like pilots* flying without instruments— all is well until the *weather turns ugly.*

Also, measurement programs are expensive. Metrics typically account for between 5 percent and 8 percent of an IS project's operating costs, according to Howard Rubin, CEO of Rubin Systems and editor of the "IT Metrics Strategies" newsletter for the Cutter Consortium, an IT consultancy based in Arlington, Mass.

If CIOs believe metrics' usefulness is relatively limited and the cost is relatively high, it follows that the discipline drops to the bottom of their priority lists. But most project managers are like pilots flying without instruments—all is well until the weather turns ugly, says Rubin. "When the squeeze comes, and the managers have to improve their efficiency, effectiveness or value, they don't have a clue. They're fair-weather pilots," he says.

Keeping their eyes on a handful of high-level metrics can help CIOs track multiple large projects and, ultimately, improve business performance. "If you can't measure it, you can't manage it," says Domeyer. "I still always go with my gut feeling, but I have to have something more solid and measurable to back it up."

Metrics aren't new and they aren't magic, and measurement methodologies abound. But by keeping it simple and exercising some discipline when delivering, you'll be able to roll out major IT projects successfully. So when you're mapping out your company's next ERP or e-commerce project, for example, make sure the following metrics are part of the plan.

goals – time = shortcuts

MOST COMPANIES CONDUCT an annual exercise with company officers and business unit directors in which they plan and rank key IT projects based on business requirements. Teams assigned to each project divide requirements into primary, secondary and tertiary (do it if and when you have some extra time on your hands) categories. Project managers use the business requirements as their guide when they shop for technology.

Smart managers then check back with executive sponsors to make sure the software and the project are still aligned with business goals. If not, they can change a project's scope or, as was the case with Domeyer's financial system, start the process over.

Tracking the project's alignment

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with business goals at all times helps keep project teams from becoming so distracted by other metrics, such as time and cost, that they sacrifice the original objectives. Jim Klinck, vice president of application development at insurance giant Metropolitan Life Insurance Co. in New York City, has witnessed such a sacrifice. Heroic adherence to a strict delivery date led MetLife programmers to take shortcuts that undermined the business reasons for buying a new packaged software application for administering the company's many insurance products.

One of the main benefits of the software was that it would allow programmers to define different insurance products in the system using fields in database tables, thereby sparing them the pain of having to modify the system software itself to accommodate each product. But once installation began, there was pressure to finish as quickly as possible. "The development team was given a very aggressive installation date," says

Tales of a Turnaround

Metrics helped the CIO of Olsten pull off a $20 million coup

IN 1997, WHEN JIM HARDING JOINED OLSTEN Corp. as CIO, the $4.6 billion staffing and health services company had suffered several false starts trying to implement a nationwide, integrated IT system. The abandoned projects had cost roughly $5 million, years of wasted time and the IS department's credibility.

Harding wasn't taking chances. He knew he had to put detailed measurement programs in place to keep the lid on the $20 million project. The company's existing systems traced their origins back to 1969, when Olsten was a $100 million company and a single mainframe held sway over the data center. Since then, Olsten had added a few IBM AS/400 computers to service divisional office support functions, but not much else. Harding would have to start from scratch: all-new PC-based LANs, remote e-mail, enterprise resource planning systems and a data warehouse (for starters)—in 30 months.

By 1997, Olsten was attracting major customers that wanted national and global contracts with such features as discounts, customized reporting and consolidated invoicing. Harding's task was to provide systems that would let Olsten better manage its own burgeoning base of 80,000 contract workers and provide customers with global account management.

To keep his renewal project from imploding, Harding developed a project metrics program that tracked:

Milestones—Timing the major chunks of the project, such as the LAN installation. Project team members tracked hundreds of subevents leading up to each milestone.

Performance testing—Simulating the heavy demand that Olsten's employees would put on the applications and networks.

Data conversion—Identifying data that had to be transferred to the new systems and writing programs to convert old to new.

Cost—Tracking expenses against original budget projections.

The measurement program alone cost roughly $2 million, or 10 percent of the total cost of the project. But with the company's entire IS system hanging in the balance, the metrics illuminated the difference between victory and ignoble defeat.

The project had its ups and downs, and the metrics played a role in both. For instance, with roughly two months to go before the company's new financial systems were set to blink awake, Harding's data conversion spreadsheet showed that his team would need two weeks to load the new data—bringing the system down while they did it. The project team squeezed the conversion time down to four days by working with business leaders to purge old data and reduce the data they needed to convert, and by tuning the financial application software. "If we hadn't been able to reduce [the conversion time], we would not have been able to implement," Harding says.

Achieving the milestones led to happier times. For instance, after installing the PC-based LANs, Olsten employees had a companywide intranet and e-mail system for the first time. "[Users] thought they'd died and gone to heaven, and that was just a byproduct of the total project," Harding says.

Olsten announced successful completion of its new system in June 1999. Based on his experience, Harding advises devising metrics both to catch mistakes and to create smaller victories along the way. "Then end users stick with you when the inevitable bumps arise," he says.

–L. Radosevich

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Klinck. "As a result, the message the development team received was that speed was of the essence." To the programmers, that meant making a choice: Take the time to learn the new system of database tables, or just go ahead and modify the software to the business's needs as quickly as possible. Given the strict deadlines, they often took the shortcut. They completed the system on time, but the custom modifications meant the system was neither as flexible nor as simple to upgrade as management originally envisioned.

"The reality was a much greater expense in installing new insurance products," Klinck says. "There needed to be a more balanced process of tying the measures to what were really the original business objectives."

Now Klinck is working on a complex IT project supporting the process of taking a mutual insurance company public. To avoid making the same mistakes, he is setting review points throughout the development cycle to ensure that the project is reviewed against the expected business benefits.

Cost metrics should be *most flexible* if an IT project *delivery date* is immovable and the *primary business* requirements are at stake.

time ÷ milestones = cost savings

THE CALENDAR IS CRUEL BUT consistent. It doesn't change its schedule but once every four years, and it's the best way to keep a project from spinning out of control. Setting a strict time limit of six to nine months is optimal for most projects, according to Frank Mazzucco, an application development consultant with Compass America Inc.'s Dallas office. Besides the obvious increased costs—more consulting time, higher staff wages—longer projects give businesses more time to change, which can render the original project solution obsolete.

Typically companies break the total project into milestones, each defining specific tasks to be completed by that point. Each milestone gets a firm date on the calendar, along with whatever warnings, threats or other motivations the project manager deems necessary to demonstrate that the milestones are immovable.

To keep projects on deadline, managers usually trade business requirements for time. First to go are tertiary requirements, then secondary. In some cases they must sacrifice even primary requirements to meet a deadline. Bill Smillie, a 25-year project management veteran and a partner in consulting firm PricewaterhouseCoopers' Baltimore office, recently completed a project to combine all the methods, as well as the technologies used to access them, that Coopers & Lybrand and Price Waterhouse, which merged in 1998, used for a variety of processes, including business strategy development and IT project management. But, due to a lack of timely cooperation, says Smillie, he was unable to gather method documentation from some of the company's 500 subject matter experts around the world. Even Smillie's executive steering committee was unable to enforce perfect on-time compliance. "A lot of people had pet methods that they wanted in there and they didn't really care how they affected deadlines for other folks. It was classic," Smillie says.

The steering committee agreed to stay on schedule and lessen the undertaking's scope by leaving some of the procedures off the final roster. By the time Smillie completed the project in May 1999, roughly 90 percent of the original specifications had made it into the procedures document, which is composed of 14,000 HTML pages of content. The company plans to incorporate the remaining material into the project's second phase next spring.

"In 95 percent of projects, adherence to a schedule is the most important factor because most projects are driven by time to market or, more recently, by time to year 2000," Smillie says. "It's better to begin realizing some business benefits sooner rather than waiting for a perfect solution—because you'll never get a perfect solution."

time + cost = budget

MOST COMPANIES ESTIMATE costs after determining the business requirements and scope. Typical metrics include external and internal labor, hardware, software, travel and training, support and testing. This metric should be the most

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flexible if an IT project delivery date is immovable and the primary business requirements are at stake. If, for instance, a project's time estimate is 5,000 hours of work, but at the first review, managers find it took 800 hours to complete an estimated 500 hours of work, they know they need to put more people (and thus more money) on the project, says Compass America's Mazzucco.

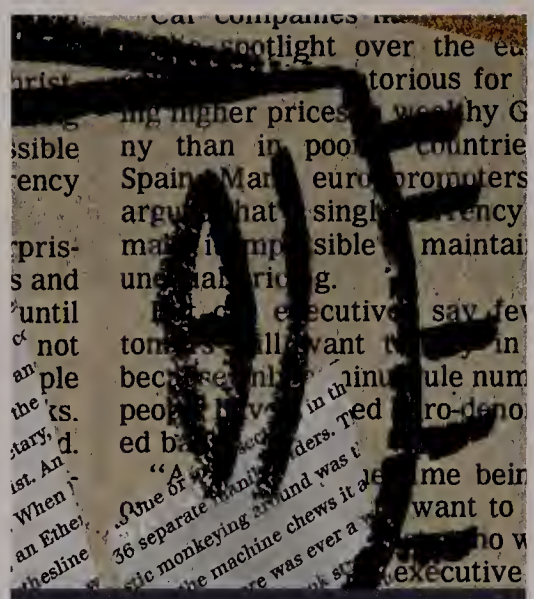
Putting cost metrics in place can also help managers spot problem areas before they kick off a project. For example, Domeyer recently noted that a particular project's line item for software seemed too high. Upon further examination, it turned out that project managers were buying new licenses for software that PG&E Energy Services had already licensed for a different project.

Because keeping development budgets under control is largely a matter of keeping projects on time, some managers put metrics in place to track individual performance. James A. Harding, CIO of Olsten Corp., a $4.6 billion staffing and health services company based in Melville, N.Y., says he pays special attention to consultants' costs by tracking individual consultants' contributions and replacing or eliminating people when necessary.

projects – testing = disaster

TESTING COMPLETED COMponents of a big IT implementation along the way under conditions that simulate the real world helps managers avoid incremental roadblocks and big surprises at the end. For Harding, scalability testing spelled the difference between completing Olsten's ERP rollout and failing completely. He had put volume-testing metrics in place for processing and response times based on real-world usage levels. For one segment of the project, the company planned to use a packaged application for entering the work hours of 80,000 contract employees each week. The packaged application met Olsten's functional requirements, and it worked well for limited numbers of users in the development labs. But when Harding's team simulated a real workload, the application crashed. After the vendor repeatedly tried and failed to fix the scalability problem, Harding decided to build the application from scratch. Doing so set the project back three months but saved it from a disastrous ending.

"We would have been dead in the water if we hadn't changed [to a custom-built system]," he says, adding that he wouldn't have discovered the problem before rolling out the system had the volume-testing benchmark not been in place (for more details on Olsten's ERP project, see "Tales of a Turnaround," Page 56).



If the *business people* aren't *happy*, ontime delivery and tight *budget* controls don't matter much.

metrics – discipline = no metrics

IN ADDITION TO ESTABLISHING application development metrics, some managers are putting metrics in place to create continuous feedback loops with the business people who use the software. If they aren't happy, ontime delivery and tight budget controls don't matter much.

At PG&E Energy Services, for example, CIO Domeyer conducts interviews and surveys to create benchmarks for business units' satisfaction with new developments. She then measures percentage point variations and looks for patterns that may highlight successful and problematic areas. "The survey metrics aren't a substitute for talking with people, but they help me detect trends," she says.

While metrics programs are crucial, they lose their impact without an effective project manager. "The number-one reason project management fails is because the managers are too soft. They don't do the right thing, which is to examine scope at each phase of the project and have the business users chose time and functional tradeoffs," says author and consultant Whitten.

There is no substitute for a stellar project manager. But even the most experienced hands benefit from methodical measurements that let them spot variances and act before problems spiral out of control. "As a CIO, I have so many projects going on—[42 at last count]," says Domeyer. "When you're juggling that many, you get overwhelmed if you don't have control systems in place." CIO

Lynda Radosevich, deputy features editor at InfoWorld, *can be reached at* lynda_radosevich@infoworld.com.

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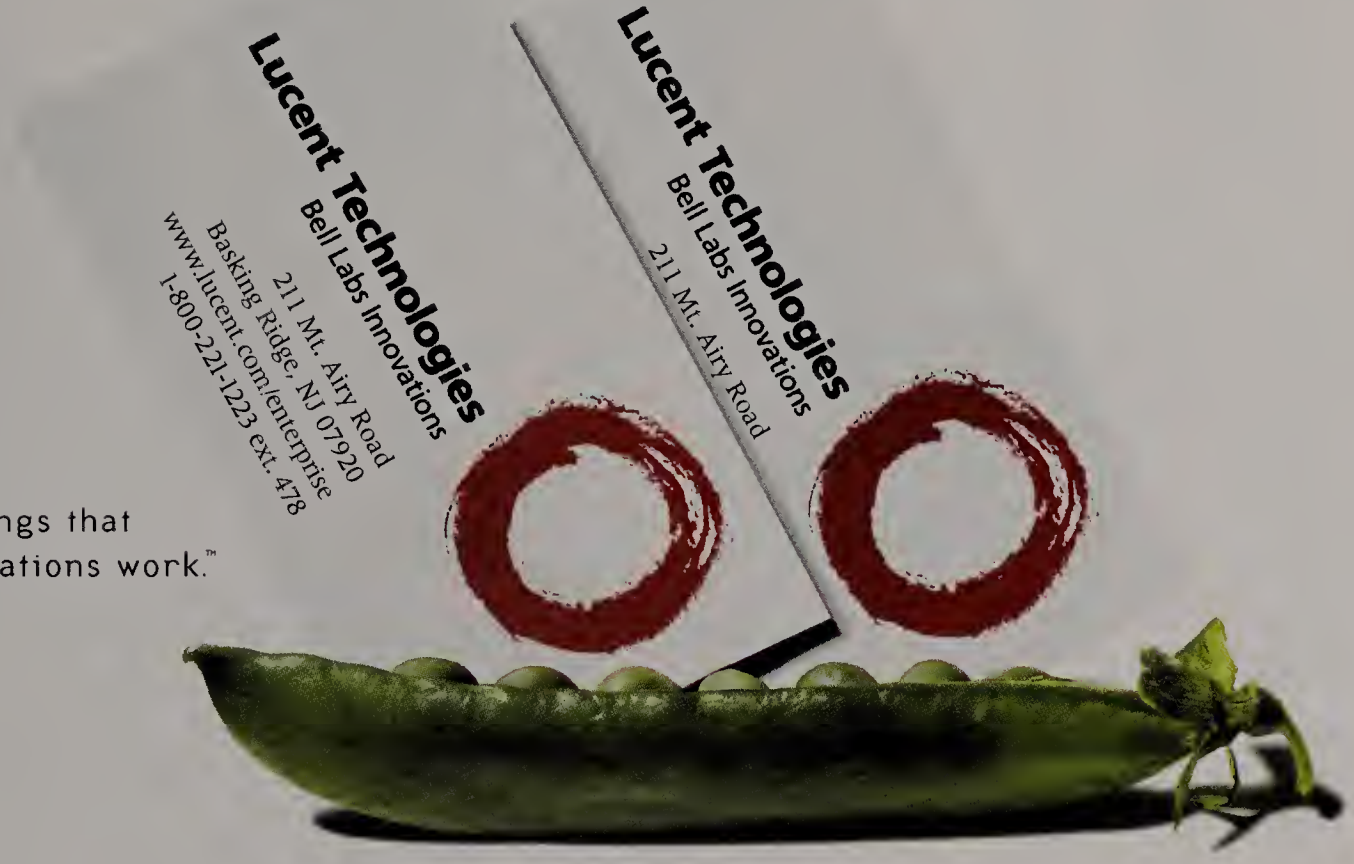

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Exploring the Heart of the Enterprise

CIO PERSPECTIVES

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Lynda Rosenthal and Gary Beach

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Join your peers at the century's last *CIO Perspectives*® conference, **Anatomy of IT Partnerships: Exploring the Heart of the Enterprise**, October 3-6, 1999 at the Hyatt Grand Cypress in Orlando to examine how organizations increasingly use unique internal and external strategic partnerships to strengthen their market presence and competitive advantage.

Our Wednesday keynote presenter, **Don Tapscott**, author of *Blueprint to the Digital Economy: Creating Wealth in the Era of E-Business*, is leading two research initiatives: the first on governance and the changing role of governments in the future, and the second on what the opportunities in e-commerce really mean for business strategists and the enterprise. Tuesday keynote presenter, **Arthur Miller**, highly respected Harvard law professor and copyright expert, offers insight into the legal complexities of intellectual property that executives must consider in partnership agreements. Featured presenter, **B. Joseph Pine II**, co-author of *The Experience Economy: Work Is Theatre & Every Business a Stage*, discusses the new economic era in which businesses create authentic, memorable events to encourage future sustainable growth. He candidly discusses how CIOs can deliver ultimate experiences within their organizations and to their customers.

General Session presenters include **Rock Regan**, CIO of the State of Connecticut; **Roger Ham**, CIO of the Los Angeles Police Department; **Tom Hanigan**, vice president and CIO of Pioneer Hi-Bred International, Inc.; **Mike Hughes**, CIO of Thomas Cook Travel; **Joyce Wrenn**, CIO of Union Pacific Railroad; **James Schmidt**, senior vice president of Technology Services of the First National Bank of Omaha; and **Robert Sweeney**, executive director of the Applied Information Management Institute.

Participants also have the opportunity to meet the executives of our Corporate Host companies during a series of business briefing sessions. Please take a few moments to turn the page and view the complete agenda.

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Regards,

Lynda Rosenthal
Senior Vice President
General Manager, Executive Programs

Gary J. Beach
Publisher
CIO Magazine

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IT Takes Two

One is the deadliest number business ever knew. That's never been more true than right now. BY DAVID PEARSON

Here's a little-known historical tidbit to chew on: It was Herbert Hoover who inserted the phrase "rugged individualism" into the national lexicon. He uttered the words in a 1928 campaign speech while paying homage to those Americans "whose stamina and character and fearless assertion of rights led them to make their own way in life."

Hoover won the election and, the next year, the stock market collapsed and the nation plunged headlong into the Great Depression.

Today, 70 years removed from the worst economic blight the country has known, it would be foolish to value untethered autonomy over collective might. In these times, partnering isn't just a contingency option. It's often the differentiating factor between those who succeed and those who succumb. The hard part at this moment is that the very parameters defining what constitutes a partnership are up for grabs.

"Forget about 'quality' and 're-engineering' and 'effective use of information,'" says **Don Tapscott**, chairman of the Alliance for Converging Technologies in Toronto and author of several bestsellers, including *Blueprint to the Digital Economy: Creating Wealth in the Era of E-Business*. "The key to competitiveness right now is business-model innovation, and the new models that work are partnerships. And they're whole new classes of partnerships — they make our old views of partnerships look quaint."

Tapscott, keynote speaker at the fall *CIO Perspectives* conference, **Anatomy of IT Partnerships: Exploring the Heart of the Enterprise**, has been studying the Internet strategies of 120 new, partnership-based businesses. By early October, he'll have insights to share from that research.

"We've been talking about partnerships forever, but what we're seeing now is completely different," he says. "For example, in the future manufacturing companies won't make things, partnerships will. Partnerships will be the foundation for the design, production, marketing, sales and support of products and services." What will be the IT executive's role in the new models? Innovating ways to exploit the Internet to enable new models of the firm, says Tapscott.

"Partnerships will be the foundation for the design, production, marketing, sales and support of products and services."

None of this can take place, however, if decision makers within individual enterprises refuse to share knowledge with their partners inside and out. Human nature being what it is, that's a definite potential scenario in many

enterprises struggling to get new partnerships up and running. "People have historically been very proprietary about what they do. They're reluctant to give away what they see as their base of power," says **Jim Wetherbe**, professor at the University of Minnesota and Federal Express Professor at the University of Memphis and returning *CIO Perspectives* conference moderator for the 14th time. "The question for them is, who are you trying to make powerful — your company or yourself?"

"You have to develop relationships, let everyone have their say, and make partners out of people who mistrust your motives."

Wetherbe has a few ideas for IT executives who find themselves in the ticklish position of having to coax business-side colleagues into sharing intelligence. "Certainly the exhortation to share information has to come from the CEO, president or someone else who has the authority to say, 'This information doesn't belong to you; it belongs to the company,'" says Wetherbe. "But few CIOs recognize how aggressive they need to be to support that imperative and make sure it gets done."

Of course, there's a counterbalancing danger in being too willing and eager to open the information pipelines — and some of the gravest peril lies in the uncharted legal waters of inter-organizational partnerships. "It's critical in entering partnerships that there be the clearest understanding as to who has the intellectual property rights in whatever is produced by a joint venture," cautions **Arthur Miller, Esq.**, the Harvard law professor best-known for his national television commentary on complex court cases. "It's not only a matter of sorting out who will have the right to reproduce what, but also dealing with issues raised by licensing and creating new derivatives from the shared information."

Matters that were never part of a partnership in the past — or never very important to it — now may prove to be the real economic core of a relationship, says Miller. "I've seen lots of instances in which the failure to clarify joint interests has proven very damaging," he adds.

That's not to say fear of legal exposure ought to make anyone partnership-shy. Indeed, on the bright side of the law, **Roger Ham** of the Los Angeles Police Department — not only its CIO, but also a commanding officer — has learned a few things about the finer points of partnering with folks inside and outside the organization. The LAPD recognized it would need friends in high places if it were to rise from the ashes of several highly publicized snafus, and came up with some creative approaches to win them over as partners.

First the department raised $15 million in contributions from corporations and private individuals for technology. Then they set about finding ways to stretch their windfall budget. For example, a vendor that helped set up automated, camera-based ticketing for cars that run red lights shared the expense of the implementation — and they'll share in its fruits by taking a percentage of the revenues it produces.

"You can have a cop on every corner and crime will still take place," says Ham. "Technology helps us get the job done in a much more-cost effective way than just putting more officers on the streets. Partnering with the community in myriad ways means we can make the city a safer place to live and a better place to do business."

Half a country away, IT leaders in metropolitan Omaha, Nebraska, have found partnering indispensable to the health of their technology infrastructure. Specifically, they recognized seven years ago that the staffing shortage had become so dire that it was a matter of join together or die. Today Nebraska has a dynamic set of programs comprising everything from applied research to a booming IT curriculum in area high schools. "We're totally apolitical, and we're united in our desire to keep this area in the thick of things, technology-wise," explains **Bob Sweeney**, executive director of the Applied Information Management Institute, the organizing body behind the effort. "That allows us to enable our business, academic and government communities to come together in a non-threatening way and work on problems that we all have, but that no individual entity could solve on its own." Sweeney will be joined onstage in

Orlando by two active AIM members, **Joyce Wrenn**, CIO of the Union Pacific Railroad, and **Jim Schmidt**, senior vice president of Technology Services at the First National Bank of Omaha.

The Nebraska students getting a taste of technology would appreciate the message **B. Joseph Pine II** has lately been spreading. Co-author of *The Experience Economy: Work is Theatre & Every Business a Stage*, Pine says that, as the agricultural age gave way to the industrial age earlier this century, the service economy is now moving past peak and giving way to a new era. "We're moving to an economy of experiences — memorable events that engage each customer in an inherently personal way," he says. "IT's role will be to partner with business so it can stage the experiences the customer will demand."

Asked how at Orlando this fall he might convince an audience of skeptics of the certainty of such a prognostication, Pine says he believes the underlying framework of his presentation will bear out its gravity. "We've already seen one epochal shift in our lifetime," he says. "Twenty years ago people mourned the 'hollowing out' of our manufacturing base, crying that doomsday had arrived. Well, manufacturing is now less than 20 percent of the gross domestic product, and the Internet is the greatest force of commoditization ever — for both goods and services. This is no fad; it's another epochal shift."

Gregg "Rock" Regan knows a thing or two about seismic events, the chaotic effects they spawn and the importance of strong partnerships in weathering them. CIO of the State of Connecticut, he's had to live up to his nickname as he's endeavored to outsource the entire IT operation of that state's government. First he was buffeted at every turn by unions, the media, legislators, vendors and employees. Then he could only watch as the initiative went belly-up. By the time the ordeal had ended, he had learned some hard lessons about partnering. "When consesus counts, innovation is not always rewarded," he says. "You have to develop relationships, let everyone have their say, and make partners out of people who mistrust your motives. After all, if you don't have buy-in, you don't have real partners."

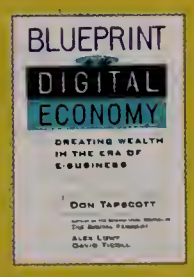
And if you don't have strong partnerships of the contemporary kind — bold, dynamic and innovative alliances that make your enterprise far greater than the sum of all its parts — you don't have a future.

Senior writer David Pearson may be reached at dpearson@cio.com.

Digital Dynamos

In the new economy, partnerships will prevail

From Don Tapscott's latest book, "Blueprint to the Digital Economy: Creating Wealth in the Era of E-Business": A clear framework and strict regimentation worked on many battlefields and marketplaces of the past. The role of the overarching infrastructure of the firm or army was clear and indivisible.



But today, as Riel Miller, a collaborator of the Alliance for Converging Technologies, puts it:

"The Net changes what is possible. It opens up new horizons for what is economically and practically feasible. The costs of information and coordination are dropping. More than ever we are in a position to create wealth by adding knowledge to each product at each step."

So how are these developments changing the nature of the firm? What are the new concepts to be implemented for success in the new economy? Most important is the concept of community — much touted but little understood. Relationships, both business-to-business and business-to-consumer — are key as firms learn to co-evolve in online business communities.

Driven by the need to reduce supply-chain costs and respond more quickly to end-user demands, communities of companies are using networks to trade with one another and create products or services that draw on the talents of many players. Digitally savvy firms in every industry are beginning to use this model to establish the conditions for value creation and dominance.

Every attendee will receive a complimentary copy of Tapscott's latest work.

CONFERENCE AGENDA

Anatomy of IT Partnerships

Exploring the Heart of the Enterprise

OCTOBER 3-6, 1999 ▪ HYATT GRAND CYPRESS ▪ ORLANDO, FLORIDA

SUNDAY, October 3

11:30 a.m.
The Leaderboard Classic Golf Tounament
Hosted by Cabletron Systems and Lockheed Martin Corp.

3 p.m. – 6 p.m.
Conference Registration

7 p.m. – 9 p.m.
Welcome Reception and Registration

9 p.m. – midnight
Hospitalities/Networking

MONDAY, October 4

7:30 a.m. – 8:30 a.m.
Breakfast

8:30 a.m. – 9 a.m.
Welcome, Opening Remarks and KnowPulse℠ Poll

Gary Beach
Publisher
***CIO* magazine**

The KnowPulse ("Knowledge") poll, an ongoing opinion poll conducted by *CIO* magazine, captures IT and business executives' perspectives on current topics in the news. Past polls have been covered by *CIO* magazine, as well as other prestigious media organizations, including *CNN*, *Newsweek*, *The Wall Street Journal*, and *U.S. News & World Report*.

9 a.m. – 9:45 a.m.
Interorganizational Partnering: Competitive Advantage Through Information Sharing

Dr. Jim Wetherbe
Professor
University of Minnesota
Federal Express Professor
University of Memphis

Conference Moderator

Since the possession of information denotes power, interorganizational information sharing has traditionally been problematic. However, organizations are learning that enormous cost-reducing competitive advantage is available when they partner in ways that allow them to share their information resources.

In this session, Wetherbe will provide colorful and dramatic examples of how competitive advantage can be gained through information sharing.

9:45 a.m. – 10:45 a.m.
Partners in Travel

Mike Hughes
CIO
Thomas Cook Travel

Thomas Cook is one of the world's largest travel and financial services companies, and its Global Traveler Services business handles the needs of travelers anywhere in the world, 24 hours a day. With a single call, customers gain access to a comprehensive range of services that include hotel, plane and car reservations; emergency cash within ten minutes; translation and courier services; and medical and legal assistance worldwide. This global call center handles thousands of calls per day in more than 30 languages. Hughes shares the planning, analysis and implementation of this world-class call center and its unique business-to-business role.

10:45 a.m. – 11:15 a.m.
Coffee Break

11:15 a.m. – 12:30 p.m.
Omaha AIMs High: A Model Business/Education Partnership

Jim Schmidt
Senior Vice President
Technology Services Division
First National Bank of Omaha

Robert Sweeney
Executive Director
Applied Information Management Institute (AIM)

Joyce Wrenn
CIO and Vice President of Information Technologies
Union Pacific Railroad

The AIM Institute was created in 1992 as a non-profit membership organization composed of corporate, academic, and state and local government members to support Omaha and Nebraska's IT-related business growth. Over the past seven years, AIM has focused on secondary and post-secondary IT curriculum, continuing education, research and labor

CONFERENCE AGENDA

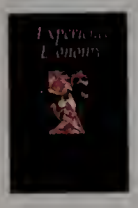
availability within the state.

Wrenn and Schmidt discuss how their partnerships with AIM member organizations have helped to bridge the critical IT communications and skills needs within their organizations.

12:30 p.m. – 1:30 p.m.
Luncheon

1:30 p.m. – 2:45 p.m.
Welcome to the Experience Economy: Strategies for the Next Era of Business

B. Joseph Pine II
Co-author
The Experience Economy: Work Is Theatre & Every Business a Stage



The service economy of the last 30 years is about to be superseded by an "experience" economy in which businesses distinguish themselves by orchestrating authentic, compelling and memorable experiences. By looking beyond traditional business models, Pine provides a blueprint for a new economic era to encourage future sustainable growth in organizations that engage clients in inherently personal ways. Pine offers a creative, highly original and eminently practical strategy for CIOs to script and stage the experiences that will transform the value of what they produce by delivering ultimate experiences within their organizations and for their customers.

2:45 p.m. – 3:35 p.m.
Business Briefings

3:35 p.m. – 4 p.m.
Coffee Break

4 p.m. – 4:50 p.m.
Business Briefings

5:30 p.m. – 7 p.m.
Reception
Gather to share today's experiences with each other and our Corporate Hosts.

7 p.m. – midnight
Hospitalities/Networking

TUESDAY, October 5

7:30 a.m. – 8:30 a.m.
Breakfast

8:30 a.m. – 9:30 a.m.
Private-Public Partnerships: Are They Really Possible?

Rock Regan
CIO
State of Connecticut

In an effort to significantly improve the effectiveness of its government services, the State of Connecticut embarked on a unique IT outsourcing initiative to turn over the management of its entire IT operations to a private vendor. Although contract negotiations were eventually terminated and the state decided to proceed with the modernization in-house, Regan was able set a precedent in exploring external partnerships for other states to follow. He will discuss the state's negotiations with employees, unions, legislators, media, vendors and citizens, while addressing lessons learned for other public and private sector CIOs.

9:30 a.m. – 10:15 a.m.
Creating a New Agricultural Enterprise: The DuPont/Pioneer Hi-Bred Story

Thomas Hanigan
CIO
Pioneer Hi-Bred International

DuPont, the world's 16th largest U.S. industrial/service provider and Pioneer Hi-Bred, the world's largest seed manufacturer are committed to improving life all over the world. These two research and manufacturing giants have announced their impending merger, promising more efficient research and development and innovative products to enhance the quality of life. Developing a plan to merge cultures has proved to be a significant IT challenge.

How do you merge diverse technology organizations that differ in their core competencies? DuPont relies heavily on external partnerships and has a decentralized approach while Pioneer Hi-Bred has a recognized centralized management style and in-house information technology architecture. Each has realized success in its approach and implementation of technology and information management. Hanigan discusses how this partnership and the blending of each company's core competencies and management styles are being carefully calculated and considered. He identifies the steps taken in examining, testing and re-inventing each company's individual partnerships.

10:15 a.m. – 10:45 a.m.
Coffee Break

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10:45 a.m. – noon
IT Partnerships — The Heart of Life on the Beat

Roger W. Ham
CIO
Los Angeles Police Department

As the world's twelfth largest economy with over 15 million residents, Los Angeles is at the forefront of media and entertainment access, manufacturing innovation, scientific advancement, academic research and technological advancement. With its goal to reduce crime and the fear of crime in this thriving metropolis, the Los Angeles Police Department (LAPD) has made significant changes to redefine itself as a safer and more attractive location to do business. The department has developed a comprehensive, coherent and coordinated approach to providing police and security services, with particular emphasis on community policing. Partnerships with federal, state, and local agencies, technology corporations, universities and community advisory boards have created opportunities for funding support of major technology initiatives. Ham discusses how these alliances have reduced crime in the area to a level lower than the state average.

Question and Answer with Roger Ham Moderated by Arthur Miller

Noon – 1 p.m.
Luncheon

1 p.m. – 1:50 p.m.
Business Briefings

2 p.m. – 2:50 p.m.
Business Briefings

3 p.m. – 3:50 p.m.
Business Briefings

3:50 p.m. – 4:15 p.m.
Coffee Break

4:15 p.m. – 5:30 p.m.
What CIOs Need to Know About Intellectual Property

Arthur R. Miller
Professor of Law
Harvard Law School

Today's CIO must know the basics about intellectual property law in order to ensure that his/her organization does not engage in acts of copyright or patent infringement or jeopardize important information property rights. Copyright law has been completely transformed by modern technology into one of the most dynamic and important areas of contemporary law. In the last two decades, copyright protection has been recognized in software, databases and computer-generated works. These forms of expressive information are now among the most valuable of corporate assets — making their protection and the avoidance of their infringement absolutely critical. What are the basic rules that ensure maximum protection is secured and the risks of infringement minimized? Miller discusses the guidelines for these objectives, as well as the implications of Internet communication to assure that corporate copyrights are protected and infringement avoided.

5:30 p.m. – 7 p.m.
Reception with Arthur Miller

WEDNESDAY, October 6

7:30 a.m. – 8:15 a.m.
Breakfast

8:15 a.m. – 8:30 a.m.
KnowPulse℠ Results

Abbie Lundberg
Editor in Chief
***CIO* magazine**

Lundberg will present the results of Monday morning's poll.

8:30 a.m. – 10:30 a.m.
E-Business Communities and the Creation of Wealth

Don Tapscott
Chairman
The Alliance for Converging Technologies
Author, *Blueprint to the Digital Economy: Creating Wealth in the Era of E-Business*

The key to competitiveness in the digital economy is business model innovation. New models are emerging that are about as different from the integrated, industrial age corporation as they were from the feudal craft shop of the prior agrarian economy. The traditional organization is being usurped by e-business communities — the emerging model for wealth creation and successful commerce. Digitally savvy organizations in every industry are changing business models to establish the conditions for value creation and dominance. Marketing, advertising and the creation of brands are all turned upside-down in this new world. Tapscott describes the different types of e-business communities — open markets, aggregators, value chains and alliances — with examples of business strategy changes and the role of the IT executive in achieving transformation.

10:30 a.m. – 11 a.m.
Coffee Break

11 a.m. – 11:30 a.m.
Question & Answer Session with Don Tapscott

11:30 a.m. – 11:45 a.m.
Closing Remarks
Jim Wetherbe

Business Briefings

Making Customer Profitability Measure Up

Paul Zaffaroni
Services Division Leader
Acxiom Corporation

How does a savvy CIO respond to today's constantly changing business landscape and build a framework to create strategic advantage for the enterprise? By organizing and providing access to data inside and outside the organization, a savvy CIO can use customer information for customer acquisition and retention for many other profitability levers within the company. CIOs can implement customer retention models that can multiply ROI and create additional models to predict early defection.

As the CIO tears down silos of data within the business and overcomes obstacles presented by legacy systems, he/she is able to capitalize on the impact customer knowledge can have as an enterprise change agent.

Delivering a Higher Form of Enterprise Business Intelligence

Katherine Glassey
Co-founder and Chief Technology Officer
Brio Technology

More so than at any other time in history, delivery and use of corporate data is critical for organizational growth and survival. Only now has the infrastructure existed to connect disparate systems and provide information access across the enterprise, regardless of its format and who needs to use it and where. For today's extended enterprise — from customers, suppliers and partners to internal end users of all skill levels — business intelligence for the enterprise is not what it used to be. In this session, Glassey reveals five common misconceptions about business intelligence, and discusses ways to derive higher value and achieve competitive advantage throughout the enterprise.

Anatomy of an E-Commerce Partnership

Henry Fiallo
Executive Vice President and CIO
Cabletron Systems, Inc.

In developing and deploying an e-commerce strategy, companies need to be visionary while looking to streamline their business processes. You must first understand your internal strengths, weaknesses, external opportunities and threats (S.W.O.T. analysis). Increasingly, companies in all industries are implementing e-commerce solutions to gain the competitive edge. Most of these companies strive to offer faster customer service, superior hosting capabilities, and extended global points of presence. But, for a more efficient and less painful e-commerce deployment, companies shouldn't go it alone. Indeed, by forming strategic partnerships with leading players in e-commerce development, companies can ensure themselves a more successful site with a higher return on investment.

In this session, Fiallo discusses the essentials to building a successful e-commerce partnership. He explores some of the keys to finding the right partner, as well as break down the roles each company should play in completing the project.

Does Your Front End Know What Your Back End is Doing?

Sam Spadafora
President and CEO
Chordiant Software, Inc.

For large consumer companies, the Web raises significant challenges: why is it important to integrate electronic commerce centers with traditional customer centers such as branch offices and call centers? Can large consumer companies leverage e-business while maintaining continuity with existing operations? Can call centers mirror the pace of change, the popularity, and the personalization of electronic commerce? Will the Web ultimately overtake the call center and traditional operations? Or will the Web be integrated into existing organizations?

As e-commerce becomes increasingly accepted, savvy companies are leveraging their existing resources to extend and expand their customer relationship-building efforts. Spadafora will discuss strategies that global consumer companies are using today to unite their customer relationship management operations from the branch office to the Web to the call center.

Anatomy of an IT Partnership

Jeff Biggs
Senior Director, NT Systems Engineering
LEXIS-NEXIS
Courtesy of Compaq Computer Corporation

Strategic partnerships between IT companies enable them to expand their business markets in scope and quality. The partnership between Compaq and LEXIS-NEXIS demonstrates the synergy of leveraging each company's core competencies. LEXIS-NEXIS delivers high quality, value-added, decision support information and services to their customers. The alliance that LEXIS-NEXIS has forged with Compaq has provided numerous benefits. Compaq has delivered leading edge technology, quality hardware, responsive service, competitive pricing, and the opportunity to influence future designs and technology. Compaq has benefited from the relationship by collaborating with LEXIS-NEXIS in building a modern Web environment.

CONFERENCE AGENDA

Revenue Generation Through Visualization

Sandeep Divekar
Senior Vice President
Visualization Strategy
Computer Associates International, Inc.

E-commerce is now growing into a multi-billion dollar opportunity for companies that are technology savvy. Some applications involve enhancing existing business models, while others involve creating entirely new ones. But along with these new opportunities comes the new problem of attracting and retaining customers through the Web. Design of compelling content through visualization technology, including 3-D, sound and animation is critical to the success of this new breed of application.

Storage... At the Heart of Your Enterprise

Peter Gibbs
Director of Marketing, CLARiiON
Advanced Storage Division
Data General Corporation

Providing continuous access to critical business information demands a strategic focus on storage. Since storage can account for more than half of the IT infrastructure cost, it is rapidly becoming the most valuable and political issue in businesses today. Advanced storage technology can leverage the productivity of IT organizations and enable businesses to protect and optimize their most competitive corporate asset — information.

Fibre channel and storage area networks (SANs) are driving dramatic changes in the IT landscape, much like the effect Ethernet had in client-server/LAN computing. Understanding the benefits of these new technologies and how they are being applied to enterprise storage has never been more important. Gibbs will explore where high-availability enterprise storage is headed and what it can mean to the success of your IT organizations.

Project Oracle — EDS and Delphi Automotive Systems: A Case Study on Total Customer Collaboration

Peter Janak
Vice President and CIO
Delphi Automotive Systems

Wes Arrington
President
EDS Delphi Group

On schedule. On budget. Achieved customers' demanding production readiness requirements. Those statements precisely defined the outcome of Project Oracle, a mission-critical, global business and systems project that enabled Delphi Automotive Systems to go from a General Motors subsidiary to a $28.5 billion, NYSE publicly-traded Fortune 36 company on February 5, 1999, in only 108 days. The primary challenge of the project, co-led by EDS, GM and Delphi, was to allow Delphi to split its systems from GM to enable Delphi to operate as an independent company.

Listen and learn how the companies collaborated. Explore the process that enabled the cloning of 125 systems in the US and Brazil for financial, human resources and other functional areas; collected and analyzed information on almost 900 software vendors; and designed and deployed a computing and communications infrastructure to support Delphi's operating needs. Examine the benefits and possible pitfalls of a collaborative IT partnership.

Using the Internet to Maximize the Value of Your Enterprise Relationships — How to Put Analytical Applications to Work for You

Roger Siboni
President and CEO
E.piphany, Inc.

The Internet is the new corporate backbone for establishing a customer supply chain — beginning within the enterprise and extending externally. With Web-based analytic applications, a company can now identify and differentiate its most valuable customers. The company can interact with the customers and customize their products and services on a one-to-one basis. Siboni will demonstrate how specific companies are using these analytic applications to gain a single integrated view — one that connects information from ERP, legacy, e-commerce, third-party and front-office sources. He will also illustrate how these organizations infuse new customer data back into the supply chain in which information now flows seamlessly throughout the enterprise — helping to build lifetime relationships with customers — and creating a competitive advantage for the company.

Focus on the Customer — The Information Technology Partnership

John Parkinson
Chief Technologist and Head of Global Solutions E-Business Group
Ernst & Young LLP National Consulting Services

Many factors in the technology landscape, most critically the Internet, have made it essential for the IT organization to understand what customers, both direct and indirect, want from the technologies with which they interact. Learning to take the customer's point of view will be a critical competency for successful IT organizations in the future, and the basis for a new kind of business partnership. Building this competency will not be easy, yet the effort cannot take too long or alternative sources for technology enablement will rapidly displace internal groups. Parkinson discusses some of the essential strategies for transforming the IT organization into a truly customer-centric culture.

Analytic Applications: Leveraging Business Information as a Strategic Weapon

Daniel Druker
Vice President Product Marketing
Hyperion Solutions

Analytic applications dramatically increase competitive advantage by deriving knowledge from the raw data generated or stored in ERP systems, data warehouses, and other operational systems — knowledge that enables managers across organizations to make better, faster decisions that significantly improve the bottom line.

Druker will discuss the latest trends in the fast-growing market for analytic applications, and how these solutions foster partnerships between IT and individual lines of business as organizations strive to deliver critical, actionable information.

Druker addresses how to leverage analytic applications for business reporting, analysis, modeling and planning; extending ERP and transaction processing systems with an enterprise platform for ad-hoc analysis and enterprise reporting solution; and optimizing enterprise-wide business analysis and information delivery systems to adapt to organizational changes and market volatility.

Web Sites Are Just the Tip of the Iceberg ... It's What was Below the Water that Sank the Titanic

Towney Kennard
Vice President Enablement Services
IBM Corporation

The wonderful thing about electronic commerce is immediacy and reach. How many virtual storefronts have gone global in minutes?

The flip side is ... immediacy and reach. If your site fails to perform, your problems are instantly visible. One bad experience will frustrate your employees and partners, and send your customers to the competition.

Kennard believes that in the rush to get Web sites up and running, the "business" side of e-business can be taken for granted. Proper planning, design, systems management, security, testing and recovery services are the basis for a successful Web site. He also sees the CIO's role as critical for ensuring a successful site.

The E-commerce Thrust: Exploiting the Full Potential of the Web

Mark Leary
Vice President
IDC

The advent of e-commerce is radically altering the way organizations do business. More than just a new revenue source, e-commerce is fundamentally a new model for enhancing customer relationships and business practices, including alliances and partnerships.

Making sure that the "e" portion of an e-commerce thrust is in line with current business expectations — and is able to readily adapt to those ever-intensifying demands — has become the number-one focus for IT management.

Within an e-commerce environment, the IT infrastructure — servers, networks, software, databases and staff — becomes a vital business conduit. How should CIOs respond to the mounting pressure for more timely and accurate information, higher speed and wider ranging access, and absolute integrity? Leary highlights technologies, solutions and practices, as well as the risks and rewards associated with leading e-commerce projects.

Leading with E-Business: A Success Story from Intel

Sandra K. Morris
Vice President and Director Internet Marketing and E-Commerce
Intel Corporation

The rise of e-business has added additional layers of complexity to many corporate Internet strategies. The value to the company is obvious: improved customer service and expanded sales coverage. However, the development and maintenance of these systems can be daunting.

Morris will discuss how to develop a worldwide deployment, including strong encryption; how to prioritize features and functionality; how to use the Web site to complement existing business channels; and how to measure success.

CONFERENCE AGENDA

Information Continuance: Integrated, Independent and Intelligent Solutions for the Enterprise

Nora Denzel
Senior Vice President
Product Operations
Legato Systems, Inc.

Today, customers are telling us that they must increasingly leverage their corporate data assets to make timely and knowledgeable business decisions. To do so, they require a solution that is complete, open and integrated. However, all too frequently, data and applications are still managed independently. As a result, businesses are having difficulty scaling their information systems across a variety of platforms — and across their enterprise. And the steadily shrinking "backup window" further impedes their ability to implement time-critical decisions.

Denzel will discuss how businesses must manage data movement across the enterprise to make the most of their data assets and enhance customer value. She explains how to deploy the infrastructure and technology necessary for effective management of data movement.

Managing a Successful Electronic Commerce Project

Bert Gallo
President
Retex
Courtesy of Lockheed Martin Corporation

How should your company effectively conceive, develop and deploy an information technology project in this new world of e-commerce (EC)? What makes this type of undertaking different from your traditional client server, imaging, datawarehousing or other information technology projects? Where does EC and your infrastructure information base intersect? Take a journey through a successful EC project to learn about partnership roles, management techniques and lessons learned.

Real World Communications: Powerful Choices to Advance Your Business

Mary Ann Littler
Director of Enterprise Marketing
WorldWide Marketing
Lucent Technologies

A communications revolution is taking place and this is affecting every aspect of communications — from the network, to the enterprise, to your fingertips. Network infrastructures that were once separate and distinct — voice, data, wired and wireless, premise and wide area — are merging together.

These advancements are creating applications that transform a converged infrastructure into a competitive asset — an asset that lowers costs, increases revenue, enables better customer service and removes the barriers of time and space. Littler will discuss how and why CIOs must manage these networks and applications effectively while delivering the greatest reliability and availability.

Application Flow Management in Business Critical Networks

Michael Szabados
Vice President of Marketing
NetScout Systems, Inc.

In the typical enterprise, the business operates at the application layer, while traditional tools are confined to the device and connectivity layers. Application Flow Management (AFM) is a method of managing enterprise networks by tracking applications flows and their impact on the network. AFM-based monitoring illuminates all aspects of network traffic, focusing on the applications at the heart of the business: ERPs, supply chain management systems, collaborative front office applications, and a host of other Internet and intranet applications.

AFM provides accurate real-time and historical information about application performance and network availability, and information for prioritizing traffic flows, tuning network and application performance, and planning for growth.

Merging Traffic Ahead: A Practical Roadmap to Unified Networks

Lloyd Carney
President
Enterprise Data Solutions
Nortel Networks, Inc.

The convergence of data and telephony applications is creating opportunities for organizations to enhance customer service, improve operating efficiencies and flexibility, and eliminate redundant equipment and services from network infrastructure.

Carney leads a roundtable at which several top CIOs will share ideas and address your questions for managing the opportunities and challenges posed by network convergence. The session addresses how organizations are preparing their network infrastructure for the integration of data and telephony applications. Carney identifies the best strategies for staging and phasing investments in converged network services; which applications are being driven by the convergence of voice, data and video, and how they are being used to improve business practices; and how a unified voice and data network can simplify management, reduce operating costs and improve asset utilization.

Can Your Data Center Do This?

Jeff Pancottine
Vice President of Marketing
Sequent Computer Systems

Unix or NT? Distributed or centralized? Virtual or physical? OLTP or e-commerce? The answer is yes. Pancottine will define and describe the "new" data center; one that is capable of adapting to changing business requirements while keeping pace with the latest technology breakthroughs. Participants will take a closer look at a flexible data center architecture model and an operating system strategy needed to support new age applications and e-business solutions. He will also use specific real-world examples and industry insights to highlight the changing role of the current data center.

Next-Generation Networks: Changing the Way You Do Business

Kathryn A. Walker
Vice President
Product Management
Sprint Business

Businesses today face a challenging array of issues, from providing superior customer service to building a skilled workforce to moving products to market more quickly. But implementing IT solutions that serve the needs of businesses in a changing environment are becoming far less challenging, thanks to the advent of next-generation networks. By offering new communications applications that better link internal and external stakeholders — employees, customers, telecommuters, branch offices, Web site visitors and so forth — next-generation networks make creative solutions possible for businesses' most critical communications problems. Walker will offer a case study in developing such solutions.

Multimedia Communications in a Web-Connected World

Paul Johnson
Managing Director, Equity Research Department
BancBoston Robertson Stephens
Courtesy of VideoServer, Inc.

The result of the massive and rapidly growing adoption of the World Wide Web has had a dramatic effect on the world's telecommunications networks. The challenges of meeting the demands for IP data connectivity generated by over 100 million users are compounded by growth of up to 5% a month. For the first time, a single network pipe can carry any and every type of media simultaneously.

As a direct result of this new landscape, the multimedia communications industry will change. The convergence of data, text, voice and video enabled applications will break down the boundaries of traditional markets. Similarly, the rapidly increasing proportion of broadband connected homes brings comparable access to bandwidth from both the home and office for many users, blurring the distinction between public and private enterprise. Johnson reviews the trends that are impacting the shape of the multimedia communications industry and highlights the key threats and opportunities for the large enterprise.

Business Briefings also presented by:
GTE Internetworking
Hewlett-Packard Company

CONFERENCE HOSTS

Acxiom can help CIOs tap into the valuable data captured in operational systems and make it part of an accurate, comprehensive and accessible warehouse of customer information — ultimately enabling you to deliver timely and appropriate information to end users throughout the enterprise. Acxiom's expertise in data integration assists you in transforming data into customer knowledge to drive powerful decision support applications.

Acxiom Corporation, voted one of *Fortune* magazine's "100 Best Companies to Work for in America," provides a wide spectrum of data products, data integration services, modeling and analysis, and information technology outsourcing services to major U.S. and international firms. For more information, please visit *www.acxiom.com* or e-mail us at info@acxiom.com.

Brio Technology, Inc. [Nasdaq: BRYO] is a leading provider of enterprise business intelligence software. Brio develops, markets and supports an integrated business intelligence (BI) platform that provides the most complete range of enterprise-ready products designed to improve the ability of business professionals to make timely, fact-based business decisions. The Brio BI platform enables organizations to build and deliver enterprise reporting, business intelligence and analytical applications to users in intranet and extranet environments, and enables customers to derive higher business value from their existing ERP, data mart, data warehouse and other enterprise applications. Brio has commercial relationships with companies such as Hewlett Packard, IBM, Microsoft, Oracle, PeopleSoft, SAP and Sun Microsystems. Brio Technology is based in Palo Alto, CA, and can be reached at 877-279-BRIO or on the World Wide Web at *www.brio.com*.

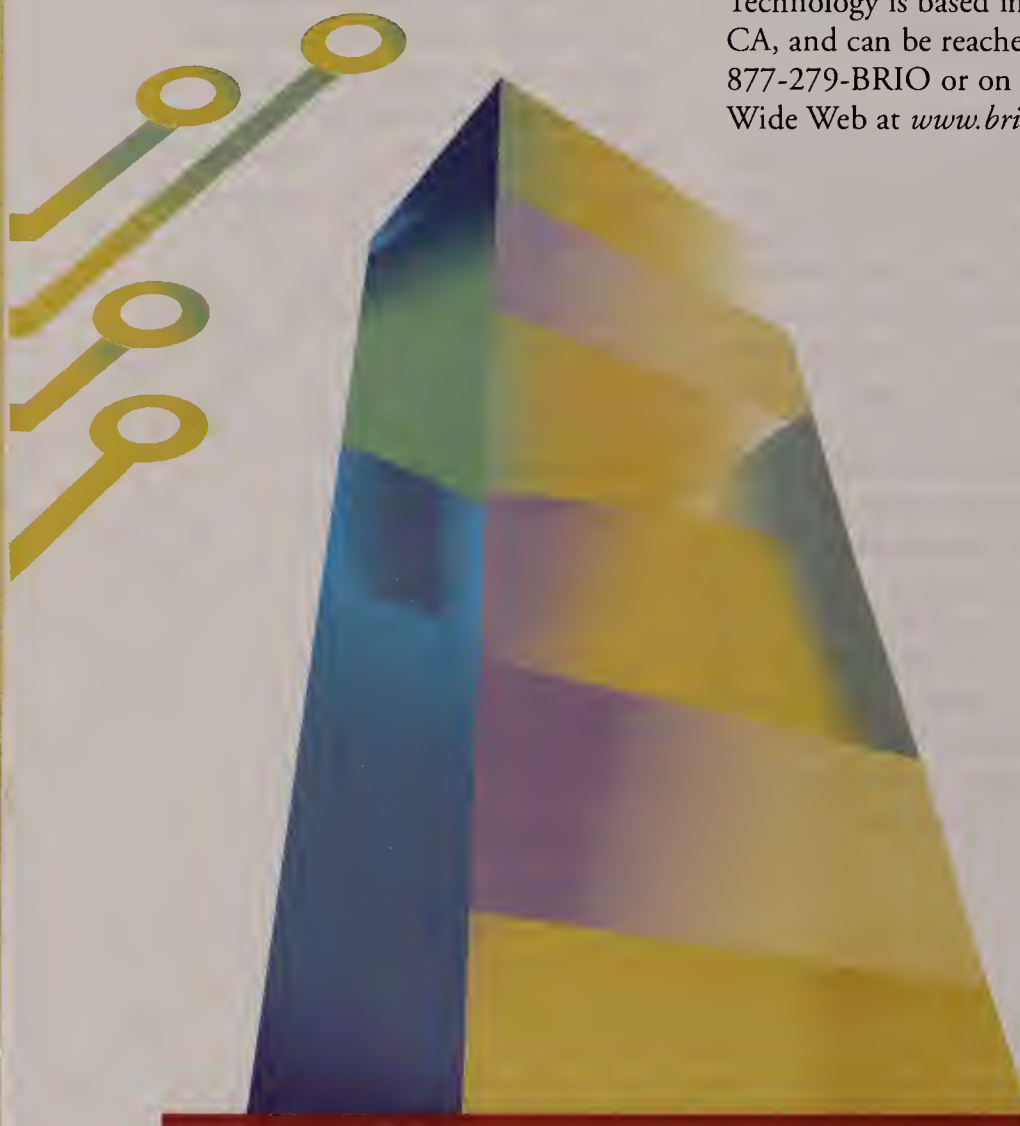
Cabletron Systems — a recognized leader in high-performance networking solutions — has provided reliable LAN, WAN, ATM and remote access communications to millions of people throughout the world. Among its many customers are Fortune 1000 companies; service providers and telcos; federal, state and local government agencies; universities and academic institutions; health care and financial institutions; small businesses and more.

Through its award-winning technology backed by an unrivaled service and support organization, Cabletron is your e-business communications specialist.

Chordiant Software builds customer relationship management applications tailored for business-to-consumer companies, serving traditional and e-business environments, with a single view of the consumer.

Unlike Web-only and customer relationship point solutions, Chordiant's flagship product, Chordiant CCS — Customer Communications Solution — embraces new customer communications methods while leveraging existing ones.

Chordiant unifies Web, branch and call centers through a single customer model that integrates all services, offerings and business goals. As a result, Chordiant allows enterprises to retain customers and grow revenue by enabling more sophisticated relationships.



Compaq Computer Corporation, a Fortune Global 100 company, is the second largest computer company in the world and the largest global supplier of computer systems. Compaq develops and markets hardware, software, solutions, and services, including industry-leading enterprise computing solutions, fault-tolerant business-critical solutions, networking and communication products, commercial desktop and portable products, and consumer PCs. The company is an industry leader in environmentally friendly programs and business practices. Compaq products are sold and supported in more than 100 countries through a network of authorized Compaq marketing partners. Customer support and information about Compaq and its products are available at *www.compaq.com* or by calling 800-OK-COMPAQ. Product information and reseller locations are available by calling 800-345-1518.

Computer Associates International, Inc. was founded in 1976 with three employees. Today, with over $6.5 billion in annual revenue, the Islandia, NY-based company has a true global presence, with 16,000-plus employees in more than 43 countries. Throughout the years, our mission has remained the same: to provide mission-critical solutions that run businesses. That's all we do. And it's this single-minded focus that enables us to deliver superior software and services for all kinds of businesses.

Data General (*www.dg.com*) specializes in providing open storage systems, servers and services for customers worldwide in industries such as healthcare, retail/distribution, manufacturing and financial services. Data General's CLARiiON high-availability, full fibre channel storage solutions feature flexible, scalable, SAN-ready products for UNIX and Windows NT platforms. Our Intel architecture-based AViiON servers offer enterprise solutions using NUMA technology for Windows NT and high-end UNIX platforms. AViiON servers, ranked number one in the Windows NT midrange server market, provide a robust foundation for such strategic applications as ERP and data warehousing.

EDS is a professional services firm that applies consulting, information and technology in innovative ways to enable clients to improve their overall performance.

Through an "end-to-end" portfolio of services that includes all aspects of electronic business, EDS is the provider of choice for thousands of leading businesses and governments around the globe. EDS' business is making clients more successful. The company works with its clients to extend their enterprises and catapult them ahead of the competition. It provides thought leadership and creates measurable value by unleashing the full potential of information and technology.

For more information about EDS, please visit *www.eds.com.*

E.piphany is an industry leader in analytic applications that offer Web-based efficiency and ease of use. The E.piphany e.4 System connects and analyzes customer data from inside and outside the enterprise — from ERP, legacy, e-commerce and third-party sources. And, since it was built using open industry standards, the E.piphany e.4 System easily interfaces with all customer touchpoint systems, including Web, e-mail, sales force automation and call centers.

Ernst & Young LLP, a leading professional services firm, today operates one of the world's largest and most influential management consulting practices. Our business improvement professionals create and implement solutions for clients that help them to improve operational efficiencies, grow their companies and use capital effectively. E&Y consultants work with leading companies all over the world on large-scale business improvement, organizational change and information technology initiatives to achieve measurable and rapidly-realized business value. As a leading electronic commerce strategies and solutions provider, E&Y enables clients to rapidly respond to market changes and gain critical first-mover advantage in new markets.

CONFERENCE HOSTS

GTE INTERNETWORKING
POWERED BY BBN

GTE Internetworking, a unit of GTE Corporation (NYSE: GTE) offers customers, from consumers to Fortune 500 companies, a full spectrum of integrated Internet services using IP networking technologies. GTE Internetworking delivers complete network solutions, including dial-up and dedicated Internet access, high-performance Web hosting, virtual private networks (VPNs), managed Internet security, network management, enhanced IP services, systems integration and Web-based application development for integrating the Internet into business operations. More about GTE Internetworking can be found on the Internet at *www.bbn.com*.

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Hewlett-Packard Company (HP) — a leading global provider of computing and imaging solutions and services for business and home — is focused on capitalizing on the opportunities of the Internet and the proliferation of electronic services. It is the second-largest computer supplier in the world, with computer-related revenue in excess of $39.5 billion in its 1998 fiscal year. HP has 123,000 employees worldwide and had total revenue of $47.1 billion in its 1998 fiscal year.

HP is extending its acknowledged worldwide leadership position in enterprise computing to the Internet and intranet marketplace, specifically in the area of e-services. An e-service is any asset that is made available via the Net to drive new revenue streams or create new efficiencies. The winners in the world of e-services will be those companies that determine how to turn their assets into services delivered via the 'Net. These services will be modular and combine and recombine to solve problems, complete transactions and make life easier.

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Hyperion gives today's knowledge workers the "freedom to succeed" with software, services and partner offerings that help them understand and optimize their businesses. More than 5,500 organizations worldwide use Hyperion's family of market-leading packaged analytic applications, OLAP server technology and tools. More than 300 leading data warehousing, OLAP tools, services, ERP, packaged application and platform alliance partners extend the value of Hyperion's products and services to deliver maximum flexibility and choice to customers.

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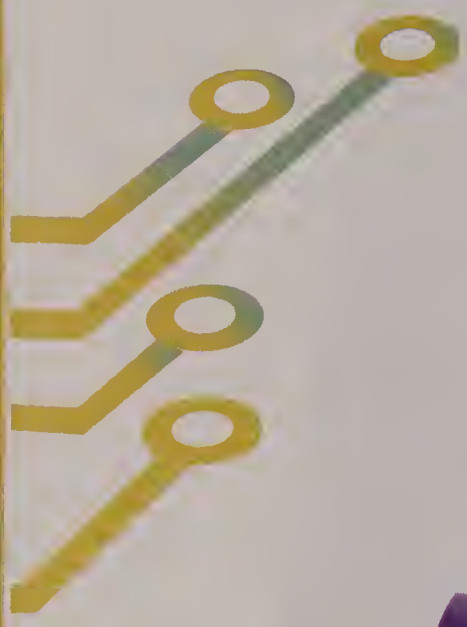
Take advantage of new business opportunities in the electronic marketplace. **IBM**'s world-class e-business services help customers conduct e-business transactions easily and securely over the Internet, while building profitable, Web-based relationships.

IBM has innovative end-to-end solutions with unmatched technical expertise, regardless of vendor or platform. IBM Global Services can help you capitalize on the next generation of growth for your company and e-business, to maximize profitability and gain a competitive advantage.



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IDC delivers all this value in a one-stop research and advisory service that provides IT professionals with unrivaled convenience, cost savings and flexibility. IDC's 35 years of experience and knowledge as the watchdog of the IT industry can help you realize maximum value and ROI from the dollars you spend applying IT to business strategy.

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When **Intel** introduced the microprocessor in 1971, it forever changed the way business worked. Today, companies incorporate Intel architecture-based solutions across their business and IT environments: from high-performance, low-cost servers to power the Internet, to high performance systems for e-business and OLTP needs.

Intel, the world's leading chipmaker, is also a leading manufacturer of computer, networking and communications products.

For more information on Intel and its role in business computing, visit its Web site at *www.intel.com/businesscomputing*.

Lockheed Martin Corporation has emerged as the business and technology solutions partner of choice for clients who demand competitive, value-added innovation in their information systems. With $5 billion in IT sales and more than 45,000 information professionals worldwide, Lockheed Martin offers business and IT architecture services, applications and systems integration, and information processing operations for commercial and government customers. Our experience spans 30 years of information management for clients in markets such as retail, manufacturing, distribution, health care, finance and insurance, as well as state and local governments.

Legato Systems, Inc. (NASDAQ: LGTO) develops, markets and supports an integrated set of enterprise storage management software products for heterogeneous client/server computing environments. Large customers around the world select the Company's solution because of its reliability, platform independence and unique ability to seamlessly integrate with existing and future computing environments. Legato's storage management software has become the recognized de facto standard with the largest installed base, representing over 60,000 customers, protecting more than 5 million systems. The company's NetWorker, BusinesSuite, SmartMedia, Celestra, FullTime and GEMS products are also licensed, resold, or endorsed by major vendors. For more information, contact Legato at *www.legato.com*, or call 650-812-6000.

Increasingly, business customers want end-to-end communications solutions that address all their needs. As you look to optimize your voice, data and video networks, you are also looking for ways to protect the investments you have made in these networks. From single-site establishments to global organizations, we work closely with our customers to deliver solutions in support of unique business objectives. **Lucent Technologies** is connecting ideas, commerce and people all around the world. Visit *www.lucent.com* for more information.

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NetScout.
Because the network is the business.™

NetScout Systems designs, develops, manufactures, markets and supports an integrated family of products that enables businesses and service providers to manage the performance of computer networks and important business software applications. Our products include data collection devices, consisting of probes and software agents that collect, aggregate and perform detailed analysis of computer network and application data, and analytical software that provides real-time network and application performance information in a user-friendly, graphical format.

NORTEL NETWORKS™

Nortel Networks works with customers worldwide to design, build and deliver communications and IP- (Internet Protocol) optimized networks — Unified Networks that create greater value for customers worldwide by delivering integrated network solutions spanning data and telephony. Customers include public and private enterprises and institutions; Internet service providers; local, long-distance, cellular and PCS (Personal Communications Services) communications companies; cable television carriers; and utilities. Nortel (Northern Telecom), one of the world's largest suppliers of digital network solutions, and Bay Networks, a leader in the worldwide data networking market merged in 1998 to create Nortel Networks. Bay Networks is a wholly owned subsidiary of Nortel Networks. Core competencies include: large-scale design and implementation; global network sales, service and support; technology innovation and application; account and distribution channel management; customer partnering; and management of globally diversified resources.

SEQUENT

Sequent Computer Systems, the leader in Intel®-based systems for the data center, is committed to the success of its end-user and system integrator customers. Sequent's platform architectures and services are optimized for the scalability, availability and manageability requirements of corporate and institutional data center environments leveraging industry standard technologies and best-of-breed partnerships.

Sprint®

Sprint is a global communications company — at the forefront in integrating long distance, local and wireless communications services, and one of the world's largest carriers of Internet traffic. Sprint builds and operates the United States' only nationwide, all-digital, fiber-optic network and is the leader in advanced data communications services. Sprint has $14 billion in annual revenues and serves more than 16 million business and consumer customers.

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VideoServer, Inc. develops multimedia networked conferencing applications enabling people in multiple locations to communicate together using any combination of audio, video and data information. VideoServer connects employees, customers and partners reliably by providing seamless integration of networked conferencing over LANs, WANs and any IP- or circuit-based network. VideoServer products are known for their high performance, ease of use and robust feature set for networked conferencing within large enterprises, ISPs, carriers, government agencies and educational institutions.

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WHAT ARE YOUR ORGANIZATION'S ANNUAL REVENUES OR ASSETS?

WHAT IS YOUR ANNUAL IT BUDGET?

YOUR NAME AS YOU WANT IT TO APPEAR ON YOUR BADGE

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We urge you to make your reservations early by calling the hotel at 407 239-1234 and identifying yourself as part of the **CIO** *conference to receive the conference rate.* ***CIO will make hotel reservations for government/ military participants only****. Be sure to guarantee your room with a credit card, as all unreserved or unguaranteed rooms will be released on August 29, 1999. Hotel reservations, cancellations and charges are your responsibility. If a* **CIO** *conference Enrollment Form is not received within 48 hours of making your hotel reservation, your room will be released from the* **CIO** *room block.*

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ALL CANCELLATIONS OR SUBSTITUTIONS MUST BE MADE IN WRITING. You may cancel your conference or companion enrollment up to September 3, 1999 without penalty. A $250 administration fee will be imposed for cancellations between September 4 - September 17, 1999. ***No refund or credit will be given for cancellations made after September 17, 1999 or for no shows.*** *You may send a substitute in your place.* **CIO** *reserves the right to decline enrollment to any registrant.*

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This fee applies if you are a CIO, IS executive or hold another executive position other than those listed below.

❑ **GOVERNMENT/MILITARY = $2,675**
The fee **includes your hotel for three nights.** *Do not make your own hotel reservations;* **CIO** *will make them for you.*

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Chairman
The Alliance for Converging Technologies
Author, *Blueprint to the Digital Economy: Creating Wealth in the Era of E-Business*

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Arthur R. Miller
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Harvard Law School

B. Joseph Pine II
Co-Author, *The Experience Economy: Work Is Theatre & Every Business a Stage*

Every attendee will receive a copy of Pine's latest book.

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Robert Sweeney
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Duke Energy at a Glance

1998 Revenues: $17.6 billion

Worldwide employees: 22,000

Countries: 50+

Customers: 2 million retail electric customers in North Carolina and South Carolina

Miles of electric wires: 75,000

Natural gas liquids produced: More than 200,000 barrels per day

After CIO Cecil Smith led an IT metamorphosis, Duke's IT staff shrunk, but so did its operating costs—by $20 million.

POWER *from the* PEOPLE

An IT transformation shouldn't be all about bits and bytes. Take it from Duke Energy's CIO, who used the HR department to put his human capital first.

BY MATT VILLANO

What's a CIO's top asset?

The IT architecture? The relationship with the CEO? The corner office with the great view? Nope. Most CIOs will say it's their people. And how do they make sure those people stay qualified and satisfied?

Pose that question to CIO Cecil Smith, and he'll tell the story of how he turned to the HR organization to transform IT for global energy company Duke Energy Corp. Facing the specter of deregulation in the power industry, officials at the Charlotte, N.C.-based company hired Smith to turn around an IT department plagued with rising costs,

Reader ROI

READ THIS STORY TO LEARN

- How partnering with your HR organization can produce swift changes
- Why putting your employees to the test empowers your IT department
- How to determine who should stay and who should go

PHOTOGRAPHY BY ROGER BALL

staffing problems and an inability to deliver on a number of projects. In just less than five years on the job, Smith solved these problems and then some. Today Duke's IT department has delivered a bevy of critical systems to its internal customers, reduced base spending by more than 10 percent and achieved operational benchmarking on par with programs 10 times its size. IT turnover is up, but so are job satisfaction, employee efficiency and technical proficiencies. What's more, at a time when many utilities are losing money, Duke's overall profits are rising.

And the effects of Duke's IT transformation go far beyond the quantifiable. Members of the IT department say that office morale has improved and the culture has changed for the better. Employees are leaving some of Duke's business units for the IT group, and some of the department's internal customers have considered applying for transfers to IT. In addition, other department heads want to know how they can use HR to help solve problems in their departments.

When Duke's IT department suffered a dramatic increase in turnover, Christopher Rolfe, vice president of corporate human resources, pursued aggressive hiring tactics.

MAKING ORDER OUT OF CHAOS

SMITH CAME TO DUKE AFTER 20 years as a technologist for a local banking company. During the course of his career, he weathered major systems integration projects as well as the arrival of client/server technology. But nothing compared to the situation he walked into at Duke.

Duke was just Duke Power Co. then, a local utility that provided electricity to 1.6 million customers around the Charlotte area. It was by far the largest utility in the region, but company officials were preparing for increased competition as a result of industry deregulation in the early 1990s. They wanted to ensure that IT ran more smoothly and more cost-effectively than ever before.

Those changes wouldn't come easily. Since the mid-1980s, the department had been spread out over application development organizations in each of the company's business units. The IT department had no CIO and purchased whatever technologies customers requested, with little regard for cost. The few standards that existed were largely ignored. As a result, the IT department spent nearly $160 million in 1996, and decade-old projects languished.

Stagnation added to the woes. Prior to 1995, Duke's IT department had enjoyed less than 1 percent attrition. Because of an attractive retirement plan, few employees left the company. More than half of the department's 1,200 employees had been there for at least 12 years, and many department managers had been around since the 1970s. As a newcomer among stalwarts, Smith was the only hope for a fresh beginning in IT.

When he arrived at Duke in February 1995, Smith took some time to examine what he had inherited. His diagnosis: gravely ill. His prescription: In order to turn things around and improve overall efficiency, IT needed to establish standards, upgrade skills and refocus the workforce. Smith went straight to Christopher Rolfe, vice president of corporate human resources. For two hours, the men spoke freely about Smith's plan. When they were through, they agreed to work together.

"He wanted to make all these changes, but he realized that at the core of it all were the same basic staffing issues that face every CIO in the world," notes Rolfe. "Performance, retention, you name it, [Smith] had it on his list. He couldn't tackle those things without [HR]."

"I knew people would be an integral part of this transformation, so I wanted to put them at the center of it," Smith agrees. "I wanted to do whatever I could to keep my best people here at Duke."

During a series of meetings in 1995, Smith and Rolfe hashed out the specifics of an all-out transformation. One morning in January 1996, Smith called a general meeting for all Duke IT employees. From a lectern in the front of the company auditorium, he announced that he was going to formally change the department's name to Information Management and distributed digital desk clocks emblazoned with the new moniker. He told them the new name perfectly described his vision for the future—a department that managed information on behalf of the entire enterprise, not on behalf of itself.

But Smith didn't stop there. He dimmed the lights and detailed a plan to transform Duke's IT efforts for the deregulation age. When he finished, Smith was greeted with only mild applause. Many staffers appeared confused and unsure. Their reaction was no big surprise; for years, few if any decisions were made unless everybody in the department felt good about them. Smith was now making major changes without consulting anyone but Rolfe. The sit-

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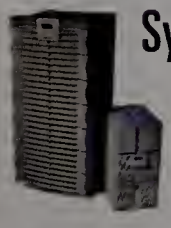

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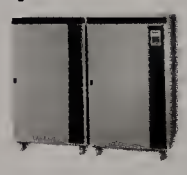

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uation made a few employees particularly uncomfortable.

"[Smith] made it clear that IM was not going to be a democracy," says Brad Davis, one of the department's general applications managers. "That was refreshing for some of us but disconcerting to others. A lot of people resented the fact that they were left out of the process."

Employees weren't the only ones worried about the future; Ruth Shaw, Duke's executive vice president and chief administrative officer, says that many of the company's senior officers were skeptical that Smith would be able to follow through on his promises. Smith remained sensitive to these doubts; he implored the staff to be patient, continuously vowing to reduce overhead and prepare the department for the future. Then Smith began the most exhaustive IT transformation in Duke history. The plan was supposed to span nearly three years and cost approximately $2 million.

PUT THEM TO THE TEST

A TOP SMITH'S AGENDA WAS TO snuff out inefficiency, an issue he tackled by determining if he had the right people in the right jobs. Together with Stan Land, a business applications division manager, and Gayle Long, a human resources consultant and manager, Smith drew up a self-assessment process for employees who worked with applications on a regular basis. The assessment listed more than 20 categories of project management and technical skills, and encouraged employees to note their level of experience in each. Employees were instructed to evaluate themselves, then review the completed tests with their managers. Managers made independent assessments of each employee, and the manager and employee discussed any differences and arrived at a final assessment.

Over the course of six weeks, more than 250 employees took the tests. Once managers had reviewed them, the information was entered into a database, which generated a blueprint for each employee's professional development. The forms provided employees with a list of required skills and target proficiencies for every job available to them in the applications area. With these documents, Long says, employees were able to sit down with their supervisors and plan for future development opportunities.

"This was our way of telling people they were important to us," Long says. "Instead of evaluating them and telling them they didn't have the right skills, we evaluated them and worked with them to make sure they acquired the skills they needed to move forward."

After his HR team evaluated these employees, Smith turned his attention to the managers who had been coordinating the organization before his arrival. He evaluated these people himself and almost immediately moved some of them into other positions. Smith hired replacements for those he moved, then set up a plan to bring in 12 new, next-level managers. But instead of hiring only from outside the company, Smith established a program to groom candidates from within Duke. More than 40 employees applied; Smith selected four of them for promotions. Smith considers this one of the most critical parts of his HR improvement plan. Not only did the program reward Duke staffers for their accomplishments, but it also showed employees that Smith was committed to including them in the changes.

"If I had just gone outside [the company] for talent, I would have alienated everyone," Smith says. "It was a deliberate move to select internal people who wanted to be part of the new IM structure."

COMMUNICATE, COMMUNICATE, COMMUNICATE

NEXT SMITH LAUNCHED AN aggressive internal communication campaign. He initiated monthly meetings during which employees could bring up anything from current projects to questions about benefits. In addition to these monthly meetings, Smith made annual all-hands gatherings a tradition for IM. He instituted biannual manager meetings and sponsored periodic manager retreats to improve camaraderie. He hired a full-time assistant to help with communication among Duke's internal customers and organizations, including publishing a newsletter. He started publishing his own set of personal reflections on the company intranet once or twice a month. With all of these meetings and publications, Smith was now bombarding employees with honest information about the changes at hand. The result was incredible.

"They were all really into it," Smith

Rules of the Road to Transformation

Thinking about using HR to change your IT organization? Read this first.

Be honest. Make sure that what you tell your people is true. Don't promise job security if you know you've got to make layoffs.

Communicate. Employees will believe in your plan only if you tell them what's happening.

Deliver. Promises are just promises unless you follow through. Be sure you can perform what you say you will.

Incite. Find a "burning platform" as a call to action. Set your goals and repeat them so that employees will catch on. Pretend you're a politician campaigning to the masses.

Stay current. Don't use technology for technology's sake. Build your plan around the latest technologies that apply to you.

Upgrade. The best way to eliminate inefficiency is to constantly work to make your staff better. The better they are, the better you are.

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says of his staff. "With all this attention, they really felt they were part of something special—which they were. People started working later and working better because they appreciated the respect we were giving them."

Many employees who hadn't bought into the plan by then became believers after Duke implemented a new appraisal system. First Land and Long were part of a team that reviewed the department's job classifications, changing the hierarchy from three broad titles to 11 more job-specific titles. Next they looked at whether they had the proper rewards in place to retain the best people. The pair set out on a benchmarking effort to analyze how Duke's compensation packages compared with packages at similar local and national companies. They found that Duke's base salaries for IM employees were consistent with what other companies were paying their IT staffers but that Duke did not offer its employees comparable incentives. In response, they adjusted salaries of a few employees that were found to be out of line with the market. They established incentive plans for mission-critical projects, a performance-based incentive plan for noncritical endeavors and a tuition reimbursement program.

Land and Long followed their incentive programs with nonmonetary offerings as well. Among these benefits were casual dress, employee recognition and in certain cases flexible work schedules. They also experimented with job swapping, enabling certain IM employees to try business-side jobs and technically skilled business-side employees to spend some time in IM. Even after Duke adjusted its IM salaries and benefits packages, Land says, Duke staffers could have gone elsewhere and earned substantially more. But the company's attention to employees and to the "little things" convinced people to stick around.

"Compared with other companies, our totals were still peanuts," says Land. "Why'd they stay? I'd say it was the fact that we helped them plot their careers and recognized them for their achievements. In the end, I probably spent more money on doughnuts and meals than on [monetary] incentives."

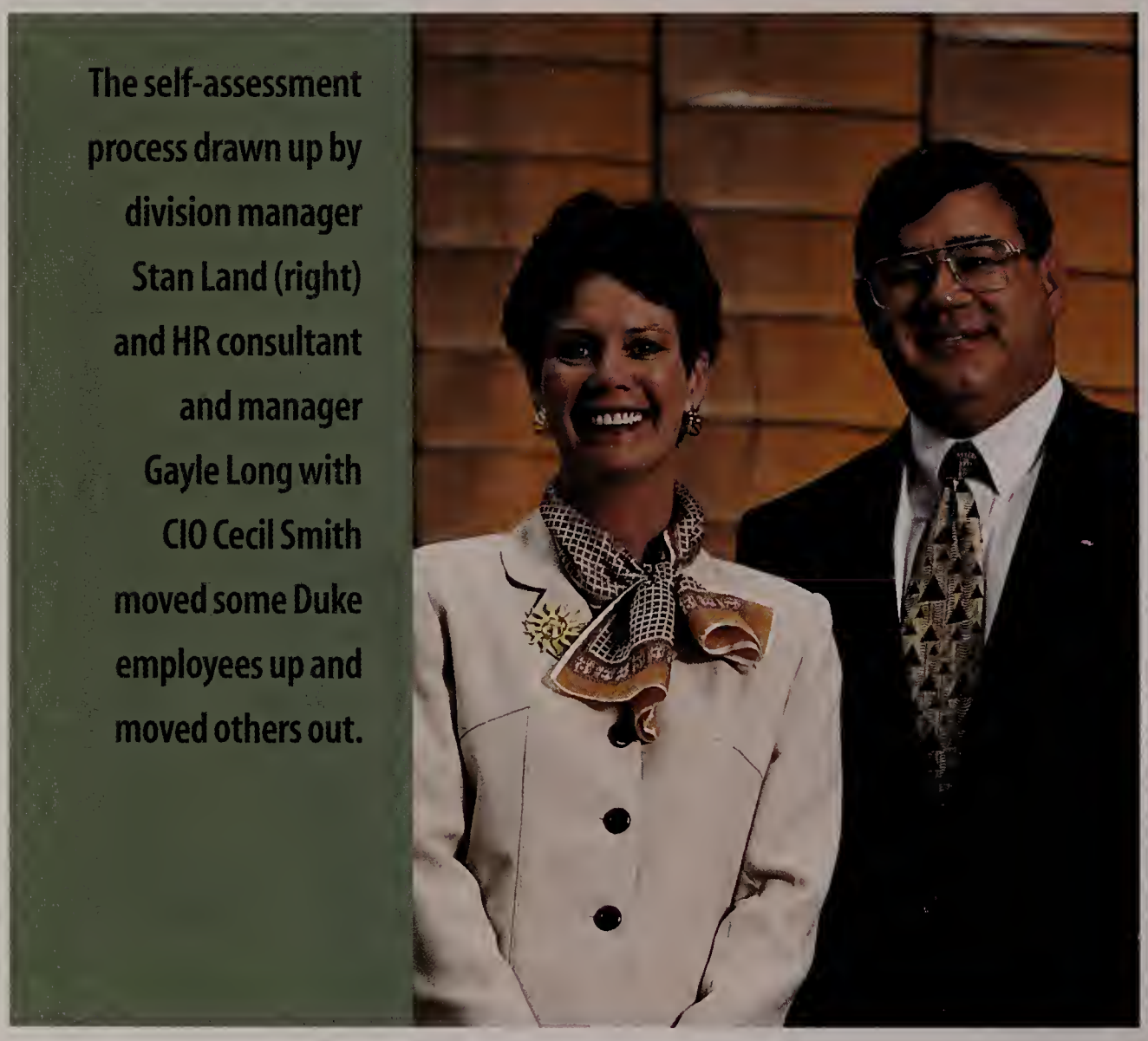
> "When you're trying to trim the fat, downsizing is always something you've got to deal with."
>
> *–Gayle Long, human resources consultant and manager, Duke Energy*

Once Duke completed skill assessments, compensated contributors accordingly and understood the mix of skills in IM, Smith began to make corresponding adjustments. About 60 employees with inadequate or unneeded technical computer skills were transferred either to another IT position or to a business unit or laid off. These were difficult decisions but necessary components of Smith's transformation strategy.

"When you're trying to trim the fat, downsizing is always something you've got to deal with," Long says. "It's not like we fired our top people. We got rid of only those people who failed to meet a certain level on their assessment exams. Many of the people who were laid off expected it after taking those tests."

Layoffs weren't all that contributed to a rise in turnover. A few IT employees took off at the very beginning of the transformation. Others left toward the end of 1996, when they were passed over in the search for new managers. Still others departed after the assessment procedure proved to them that they knew more about technology than they realized. Despite Duke's best efforts, a handful of employees left Duke for better jobs at different companies, and an additional 30 or so left to do the same jobs elsewhere for more money.

Duke counteracted these losses with some aggressive hiring tactics, including taking on people with new skills like PeopleSoft and SAP, focusing on college recruiting



The self-assessment process drawn up by division manager Stan Land (right) and HR consultant and manager Gayle Long with CIO Cecil Smith moved some Duke employees up and moved others out.

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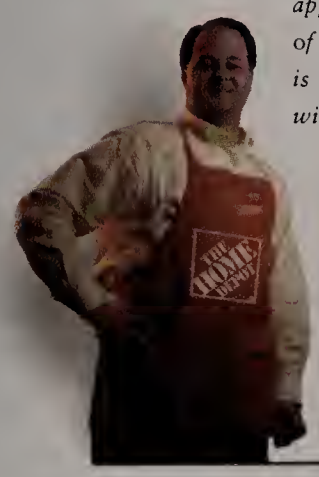

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and hiring a recruiter specifically for IM. Since 1997 Smith has hired more than 65 employees.

DEREGULATION, HERE WE COME

DUKE'S H.R. TRANSFORMATION ended in late 1997, about a year earlier than originally intended and just months after the company merged with PanEnergy Corp. to form Duke Energy. After all the layoffs and resignations, all the new hires and new recruits, IM had shrunk from 1,200 employees to just over 1,000. In 1995, before Smith came aboard, only 1 percent of Duke's IT employees left each year. This year turnover is expected to be about 10 percent. According to Rolfe, the vice president of HR, this figure is still significantly lower than the utility industry average of 15 percent.

But while turnover rose, operating costs plummeted. Records show that Smith used HR to lower IM's annual budget nearly $20 million—from about $160 million in 1996 to about $140 million last year.

Executives aren't the only ones pleased with the results of the transformation. Nearly all of Duke's internal customers agree that both service and performance have improved dramatically since the transformation ended. Jim Hicks, senior vice president of Duke's Retail Services, says a more efficient workforce has enabled him to lower his customer service costs by $2 million to $3 million a year. Because Hicks' technical support representatives understand the computer system better, they spend less time with each caller. The less time these customers spend on the phone, the happier they'll be with Duke. The happier they are with Duke, the more Hicks appreciates the changes in IM.

The new IT department means longer days but bigger challenges for Telecommunications Manager Chuck Beam.

"The degree to which this transformation has turned things around is really unbelievable," says Hicks, who briefly ran IT before Smith came aboard in 1995. "The fact that [Smith] created such a sense of vision and believability, that he could do this through HR, inspires all of us. The fact that he actually pulled it off—that's even better."

While most employees applaud the transformation, some demur. As Smith has increased expectations across the board, some employees say he has also increased pressure on them to perform. Chuck Beam, a telecommunications manager, says that since the transformation he's worked longer days than at any other time in his career. "With the higher expectations and us having to become more involved with the day-to-day leadership, the hours just went through the roof," Beam says. "I don't mind it because the job is a lot more satisfying now than it was six years ago. But I think some of the turnover that we've seen is because some of the folks are struggling with these expectations."

As Smith has increased expectations across the board, some employees say he has also increased pressure on them to perform.

Whatever the spin, one can't argue that Duke has come a long way since 1995, when it was just a local electric company. Now the company is an international provider of electricity and natural gas. Back then, the company had the technology of a small, regional shop. Today, thanks to Smith, Duke's IT department is aligned like few others in the industry. Company officials are no longer afraid of the competition that deregulation might bring. Instead, they're excited to see how Duke uses technology to measure up against some of its new, global competitors and help its internal customers.

Smith, for one, could use a bit more time to perfect some processes before the company is seriously challenged from the outside. Deregulation is on its way, and when it arrives, he wants to be ready.

"It's great for everyone to see how this hard work in HR resulted in competitive advantage for us here in IM," he says. "Now we're turning our attention to the future." CIO

Matt Villano is a freelance writer based in New York City. He can be reached at mjv@whalehead.com.

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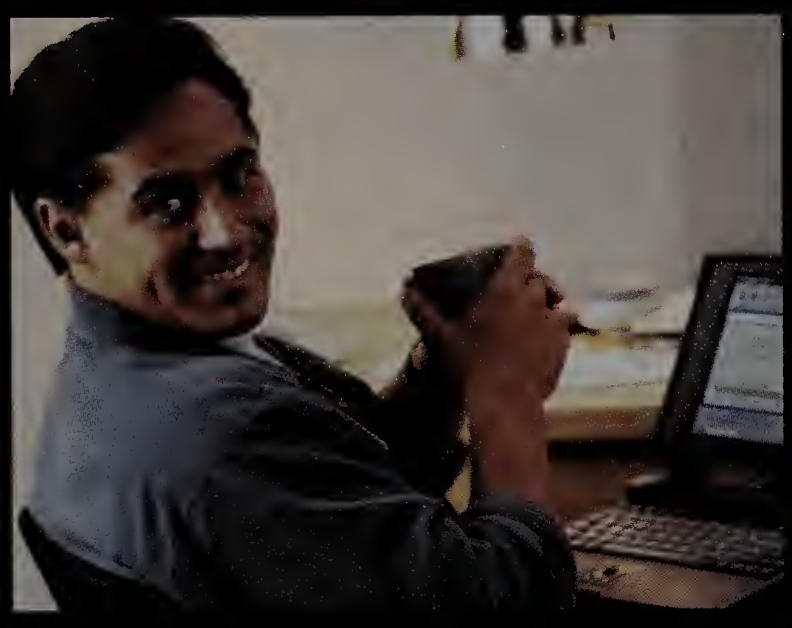

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The IT Leadership Vacuum

Without CIO leadership, IT's business value can go unrealized

BY MICHAEL L. PEDERSEN AND KAREN RUBENSTRUNK

CIOS HAVE LED THEIR ORGANIzations through tumultuous change and rid them of a widespread scourge. They may be heroes today, but the honeymoon could end sooner than anticipated. Recent trends suggest that the boardroom is demanding that CIOs demonstrate returns from the Y2K investments their business has made. Keeping the business running is just not enough. Can this be true? Absolutely, and the lack of IT leadership is to blame. CIOs unable to identify, codify and communicate in business terms the value from such investments are increasingly at risk.

Two components of leadership are crucial to CIOs' survival and success. The first is the ability to create a set of value expectations shared across all departments—one sensitive to the realities of competency, competition and culture. The second is the ability to measurably deliver on those expectations. CIOs must understand and express IT's value in a way that's meaningful to the executive. Value is simply the total future benefits to be realized by the company in one of four ways: increase in revenue, increase in productivity, decrease in cycle times or decrease in risk. The combination of shared vision and measurable action drives progressive businesses in formulating their value agenda for IT.

Are You Running a Vacuum?

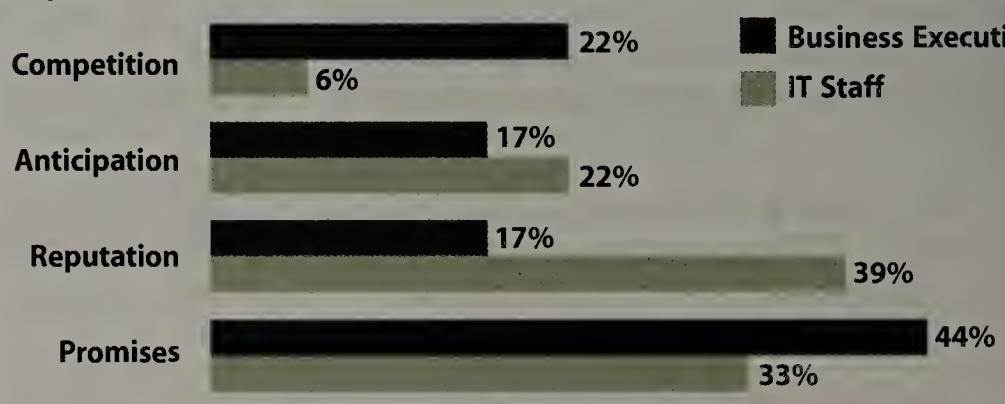
Meta Group has seen a distinct downturn in IT investment when IT staff does not lead in the management of expectations. Unfortunately, it isn't always obvious when a leadership vacuum exists. The following questions can be enlightening. The harder they are to answer, the greater your concern about leadership should be.

- Is there a cohesive business strategy for the role of IT?
- Is the CIO invited to participate in nontechnology business initiatives?
- Do you know how much business value potential exists within your IT organization?

Let's return to the debunked belief that Y2K compliance is a leadership indicator. How can CIOs be challenged on an investment that kept the business running? Quite simply, that is not how many executives view the situation. They may feel that too many resources were expended to solve what they saw as an IT problem all along. During that process, the business side began to expect something more from its investment than replatforming legacy applications. The lack of leadership in anticipating this demand now jeopardizes many careers. With the Y2K compliance halo shattered, other IT claims to

Reality Check

How are expectations of IT set? Business executives and IT staff reported the mix of forces they felt shaped their expectations of IT. This disparity can contribute to the IT leadership vacuum.



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leadership are also breaking down:

- "Customer satisfaction ratings are increasing even as we speak." Don't put your faith in lagging indicators. While actual benefit from IT services might be increasing (for example, declining mean time to repair), the perceived benefit may be well below acceptable limits.
- "Nothing screams value like 99.999 percent network availability." Infrastructure stability is indeed a priority, but that alone does not deliver business value.
- "My total cost of ownership beats the industry average." IT efficiency does not equal business effectiveness. The business expects IT to manage its shop efficiently, but as one CEO said, "You can't save your way to prosperity." These claims to leadership turn to myths as IT changes from an art form, inspired by engineers building technology solutions, to a busi-

Client Case Study

A global logistics company tackles assessment of IT's value contribution

A GLOBAL LOGISTICS COMPANY FACED A CHALLENGE common to many organizations: the need to derive demonstrable shareholder value from IT investment in terms the board would understand. The CEO readily understood investment benefits to be had from new aircraft, route optimization and operational improvements. But he understood little about realizing value from the company's investment in information technology. IT was never the company's strength, but it was clearly needed now to be competitive. With the CEO's approval of a new customer management and package tracking system that could gain market share and improve margins for the company came the rollout of a value management process to rebuild credibility for IT and deliver recognizable value from the investment.

The CIO recognized that the CFO was a key project stakeholder who was seeking new ways to prioritize and manage IT investments. To manage his expectations, the CIO prepared an IT value asset analysis identifying the current lack of investment across the application portfolio (see "Sample IT Asset Analysis," right). The ensuing discussion centered not on IT cost, but on ways to protect the existing IT resource—a corporate asset valued at $280 million. As a result, the CFO began tracking IT investment in terms the executive team used regularly for other key asset investment decisions.

Delivering the new system seemed straightforward to the CIO, but were the expectations of what constituted success the same for the executive and IT teams? Working with the executive team, the CIO codified the strategy by defining specific value statements to drive recognizable business value. Framing the benefits (see "Identify and Track Value," Page 78) in the form of value statements set expectations of what success would look like, how it was to be measured and what reporting mechanism would be used.

Several interesting benefits resulted from the process. The executive team assumed a greater sense of ownership than in previous IT initiatives; the CIO was able to communicate value delivered and in process at any time during the course of the initiative; executive team expectations for the CIO were well understood; and the value initiative was consistently communicated across the organization in terms that people could relate to at all levels, building grass-roots support for a critical corporate initiative.

–M. Pedersen and K. Rubenstrunk

Sample IT Asset Analysis

Analysis here showed that only $36 million was being spent to extend (through new development) and maintain the IT asset that conservatively required $56 million to maintain relative to replacement value. The CIO thus won the CFO's support in tracking IT investment.

Applications	Historical Spending (millions)	Market Value Replacement (millions)	Average Useful Life (years)	Annual Spending* (millions)
Sales & Marketing	$50	$60	6	$6
Cost of Services	$80	$100	5	$11
Distribution	$60	$80	5	$11
G&A	$30	$40	4	$8
Total	$220	$280	5	$36
Annual Asset Depreciation	$44	$56		

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ness discipline that is mature, can be audited and is perceived as a capital asset.

The Business Discipline of IT

Meta Group explored this issue of leadership and business discipline by researching ways to measure and increase the business value from IT. We asked CEOs, CFOs and CIOs of many major corporations, "What is your business value agenda for information technology?" Many executives did not have a formal value agenda for IT, even though they all expected IT to deliver business value.

Is there a real IT value problem or an IT value measurement problem? Either way, the results are the same. Indeed, the dilemma confronts most companies today. Meta Group research shows that only 5 percent of companies have IT measurement systems in place. For the vast majority, if they derive value from IT there is no way to be sure or to quantify it. Many companies have an IT value problem in perception only, where value delivered is taken for granted and goes unrecognized. CIOs must document the value that has been delivered—a critical first step in leveraging prior accomplishments and success into a more robust and proactive IT program.

Recognition for business value creation is essential to promote the use of IT to exploit new business opportunities. Companies need a process to measure how efficiently they manage their IT resources and how effectively the IT resources deliver business value. CIOs will then have a basis for communicating both the value that currently exists in IT (taking credit for the things accomplished to date) and the value from future initiatives that will deliver measured benefits to the organization. Key steps of this value management process include the following:

1. Establishing the IT value position: What is your company's IT equity? Developing an adaptive architecture to leverage your existing application portfolio is essential to creating capital asset management policies that justify and measure IT investments on a business basis. Applying capital asset management criteria (such as method of ownership, productive/nonproductive, operating/nonoperating) to the architecture sets the stage for replacement, betterment and other investment discussions with the CFO—clearly a key executive to influence. Existing assets can now be classified and valued, moving CFO/CIO discussions beyond cost of ownership to a more relevant value of ownership perspective.

2. Aligning expectations: What will success look like? Communicate expectations in the form of critical, measured steps to drive business value realization. You must understand not only where current executive expectations lie but also who is setting them. It may be the CIO, but it could be someone outside the IT organization. A survey of a Meta Group client shows that reports of competitors' doings and promises from IT staff significantly drive executive expectations (see "Reality Check," Page 74). Yet, the IT management team believes that its past performance and anticipation of value to be delivered sets executives' expectations. Regain control of the expectations your team is setting—and those that outside forces are setting.

3. Defining value initiatives and measurement programs: How do you measure what you value? A value statement, prepared jointly by technical and business executives for each initiative at its outset, defines the expected result for the organization. How will this project increase revenues? Increase productivity? Decrease cycle times? Decrease risks? Answering these questions will require heightened business value literacy on the part of IT professionals and a closer working relationship with the executive team. (For another perspective on measuring IT value, see "Maximizing IT Invest-

You must understand not only where current executive expectations lie but also who is setting them.

Identify and Track Value

Create formal statements of the value you expect an IT project to contribute to the business. As the project goes forward, rank yourself 1 to 5 (weak to strong) in whether you've considered, measured and achieved those goals. (Sample goals from "Client Case Study," Page 76.)

Increase Revenues Increase same customer purchase volume by 8%	**Considered?** 1 2 3 4 5	**Measured?** 1 2 3 4 5	**Value Realized?** 1 2 3 4 5
Increase Productivity Verifiable reduction in cost of shipment operations by 10%	**Considered?** 1 2 3 4 5	**Measured?** 1 2 3 4 5	**Value Realized?** 1 2 3 4 5
Decrease Cycle Time Improve pick-up and delivery service levels by route optimization	**Considered?** 1 2 3 4 5	**Measured?** 1 2 3 4 5	**Value Realized?** 1 2 3 4 5
Decrease Risk Eliminate unprofitable customers	**Considered?** 1 2 3 4 5	**Measured?** 1 2 3 4 5	**Value Realized?** 1 2 3 4 5

SOURCE: METAGROUP

ments," *CIO* Section 2, July 15, 1999, Page 66.)

IT must be managed as an asset, so its contribution can be readily known and measured. At any point in time, IT managers can communicate the value expected from approved initiatives, value now being delivered and what has been delivered. This is expectations management based on accounting principles for IT—concepts well known to, and understood by, the executive team. The business discipline of IT provides CIOs with the best tool for improving their leadership standing within the executive community.

Vision for Change

PricewaterhouseCoopers LLP stated in its November 1998 "Trendsetter Barometer" report that 80 percent of the CEOs of the 436 fastest-growing companies said that the role of information technology is extremely important to their company's success. Not just important—*extremely* important. These CEOs posted 72 percent higher revenue growth than peers who did not rate IT as highly. This reflects the new business model in which IT plays a central and driving role. Many CIOs are either incapable of effectively managing the related cultural change or, worse, unable to recognize the need to change.

Many CIOs are either incapable of effectively managing the related cultural change or, worse, unable to recognize the need to change.

To manage change well, you must have a simple vision—it should fit on one PowerPoint slide. You must also understand the distribution curve of change, with its trickle of early and late adopters and the masses in between. Many managers mistakenly view the emergence of early adopters as a sign that the culture has moved. They set expectations based on that vanguard and take their eye off the ball. With expectations out of line with current cultural reality, they lose progress and have to restart repeatedly.

The lack of IT leadership could be the downfall of CIOs. Those who believe that will take the right steps. The rest of you should update your resumes. CIO

Michael L. Pedersen, senior vice president and managing director at Meta Group Consulting in Reston, Va., can be reached at michael.pedersen@metagroup.com. *Karen Rubenstrunk, vice president and director, executive directions, at Meta Group in Stamford, Conn., can be reached at* karen.rubenstrunk@metagroup.com.

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Emerging Technology

THE STATE OF THE ART, NEW PRODUCTS AND STAYING AHEAD OF THE CURVE

Edited by Howard Baldwin

A Consistently Better View

Metadirectories consolidate islands of information for easier updating

BY JOHN WEBSTER

WHEN SOMEONE CALLS THE HELP DESK AT Sony Pictures Entertainment in Culver City, Calif., to report a computer problem, a technician in the IT department asks for the person's name, opens a help ticket and dispatches a repair person. But if the employee in need of help has just moved, and her new location hasn't been updated in the company's directory, the field technician wastes valuable time going to the wrong location. Laments Systems Manager Marc-Alan Dahle, "We are doing massive reconstruction of movie lots and people are relocating once a week. We have IS people dedicated just to moving people."

And even if the human resources department was able to instantaneously update the employee directory, which holds all full-time employee data, there are still 3,000 contractors who don't have computers but do have security cards to access the studio. Sony still needs to track information about them—addresses, salaries, superiors, you name it. Sony Pictures Entertainment is not unique. Market analysts estimate that the typical Fortune 1000 company has more than 100 directories, each containing crucial, unconnected administrative information scattered about the enterprise: e-mail addresses, telephone extensions, physical locations and computer assets. In addition to basic personnel data, directories reveal asset and security data (for internal employees and external suppliers) as well as information on who is connected to what network operating system and who can access which databases. Off-the-shelf groupware and ERP software contain their own directories, and each has its own unique formats and field structures. To help make sense of this dizzying array of company data, a handful of organizations have implemented a new technology known as metadirectories—consolidated information about directories (*meta* is the Greek word for with or among).

The problem is information changes constantly. Employees move to new buildings, get married and change their last names, have their security clearances upgraded, or they get fired and need to be removed from multiple company directories. These common occurrences can wreak havoc on a large company's directory infrastructure because this personal information is stored in a variety of formats in more than one directory. Metadirectories can synchronize this disparate information.

To keep his directories accurate and to consolidate information about people and their locations, Dahle uses a metadirectory as a central data repository. He gathered information from numerous sources: the company telephone and security system directories (both Microsoft Corp. Access databases), a Novell Inc. Novell Directory

ILLUSTRATION BY ROB DUNLAVEY

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Services directory, a Lotus Notes address book and the company's recently implemented PeopleSoft HR database. He compiled personnel attributes from these directories and can now centrally manage it all using MetaConnect, a metadirectory product from Santa Monica, Calif.-based Isocor.

Where Standards Rule

Until recently, without a standard way to link directories, IT shops were forced to create their own tools. The appearance of the lightweight directory access protocol (LDAP), a slimmed-down version of the directory access protocol in the International Telecommunication Union's X.500 global directory-structure standard, has given directory product vendors a fundamental underpinning for connecting many applications and enterprise resources over the Internet or corporate intranet.

Among the new shrink-wrapped metadirectory software products are Isocor's MetaConnect, Via from Toronto-based Zoomit Corp. (which was recently acquired by Microsoft), and DirXmetahub from Unisphere Solutions Inc., a Siemens AG spinoff in Burlington, Mass. These products can connect to applications such as Microsoft Exchange, Lotus Notes and PeopleSoft, or to databases through ODBC as well as to other directory resources to let users view information uniformly. One directory is usually designated a "master directory," and changes made there automatically disseminate to other connected directories and applications. Netscape Communications Corp., IBM Corp. and Microsoft plan to incorporate metadirectory features into their own directory server products as well.

Currently, though, no more than 5 percent of Fortune 1000 companies have implemented one, according to Neil MacDonald, vice president and research director at GartnerGroup Inc. in Stamford, Conn. This is partly because although out-of-the-box metadirectories reduce directory-management headaches, setting them up is not exactly pain-free. Some vendors and analysts recommend starting small by making directory connections between two applications to flatten the learning

Drawing a Fine Line

A venerable technology shows promise for creating tinier circuit paths

WHEN CHAD MIRKIN DRAWS a line, it's really fine. So fine that it's 10,000 times narrower than the stroke of a ballpoint pen. In fact, the venerable quill pen inspired Mirkin, a professor of chemistry at Northwestern University in Evanston, Ill., to devise a way to draw extremely fine electronic circuits.

As chips become more densely packed with transistors and other components, researchers are searching for ways to etch ever-finer circuit lines. Mirkin believes that a fresh approach to the quill pen offers the best way of drawing electrical paths that are up to 1,000 times smaller than is currently possible. "What we've done is to miniaturize a 4,000-year-old technology," he says.

Last year Mirkin and his team of Northwestern researchers realized

BULKING UP CPUs

that a phenomenon that occurs when an atomic force microscope is used (the AFM is an instrument used to look at surface structures as small as a nanometer, or one-millionth of a millimeter) could be adapted to create ultra fine lines. "Because of the atomic forces involved, a tiny drop of water often forms at the microscope's tip," he explains. "We felt we could use this to our advantage by turning it into a pen." He dubbed the creation "dip pen nanolithography." By coating the microscope's tip with a special "ink" (an oily, sulfur-containing compound called octadecane thiol), Mirkin and his team created a high-tech writing instrument that can draw a line just a few molecules wide and a single molecule deep. Like ink through a quill pen's tip, the octadecane thiol moves through the water droplet by capillary action as the microscope's tip scans across a surface. The width of the line drawn is determined by the size of the water droplet, and the water droplet can be made larger or smaller simply by raising or lowering the humidity in the laboratory. "By increasing the relative humidity, you make wider lines; by decreasing the relative humidity, you make thinner lines," Mirkin explains. While the initial test used easily malleable gold as a writing surface, Mirkin and his researchers have since been able to substitute other surfaces, including such widely used chip-making materials as silicon oxide and gallium arsenide.

Other researchers have managed to draw smaller lines. But Mirkin says his approach is more practical, since it can be performed at ordinary room temperature with equipment costing approximately $50,000 rather than the hundreds of thousands of dollars needed for the IBM method. "To raise and lower humidity, we used a $50 dehumidifier from Home Depot," says Mirkin.

Mirkin has already been approached by a variety of companies interested in utilizing dip pen nanolithography. Mirkin says he will continue to refine the technology in order to make it amenable to the mass production required in chip manufacturing, adding, "We are looking for venture capital to launch our own small startup company."

–John Edwards

ILLUSTRATION BY ROB DUNLAVEY

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Emerging Technology

curve, and expanding the number of connected directories for full-fledged deployment over a one-year time frame.

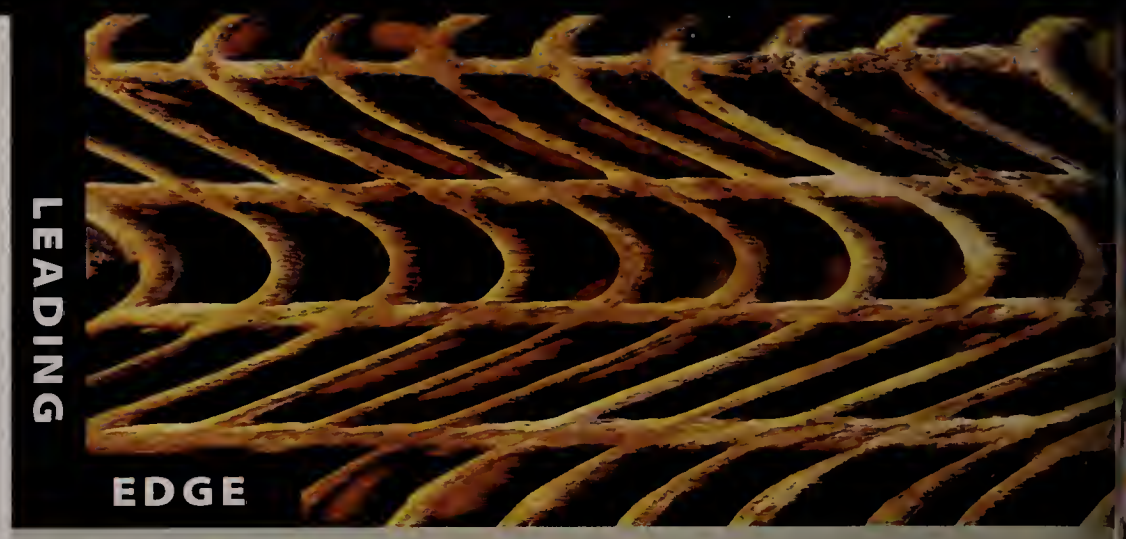
Promising Payback

IT staffers considering metadirectories readily recognize the money-saving possibilities. In the Government of Canada, Jane Marie Obst, business manager for the Government Electronic Directory Services department in Hull, Quebec, is evaluating whether to upgrade to Unisphere Solution's DirXmetahub to help keep the government's directory of 200,000 federal employees up-to-date (her organization currently uses an earlier Siemens product called DirX as a data repository). "Every two weeks, we have to manually update e-mail addresses from our government departments across the country. If we could automatically connect each internal mail program and have people access one hub, we could probably save $40,000 every two weeks."

Other companies further along in their installations also expect quick returns. Like many enterprises, Visa International initially built its own directory management tools. That home-grown solution worked temporarily for Waleed Nammari, director for Windows NT systems engineering at the San Mateo, Calif., processing services division of the credit card company. But growth made it impossible for him to keep up with his users. His custom tools let Nammari's group synchronize Visa's human resources directory with its Microsoft Exchange directory, using a Microsoft SQL database as a repository, but he had to do this daily, and some operations still had to be done manually. "I was getting user requests for more detailed fields and more information, and it became cumbersome to deal with the complexity," says Nammari. "We're growing, and more users create problems with the back-end database. This alerted us that we need an off-the-shelf directory-management solution."

Nammari anticipates a tremendous savings on cost of administration, support and maintenance of Visa's directories. "Here in the central office, it costs about $450,000 per year to maintain 10 directories. Administering the metadirectory and maintaining it in the long term will definitely be much cheaper. Currently I have several people in-house who need to look at the data every day. They go through the process lists to see that everything is synchronized. Those people are overwhelmed with work, and the metadirectory will eliminate this."

Wayne Alston, lead technical design authority at ICL PLC, an IT systems and services company based in London, faces similar problems. He uses Zoomit's Via to synchronize a Microsoft Exchange



Handheld Application Tests

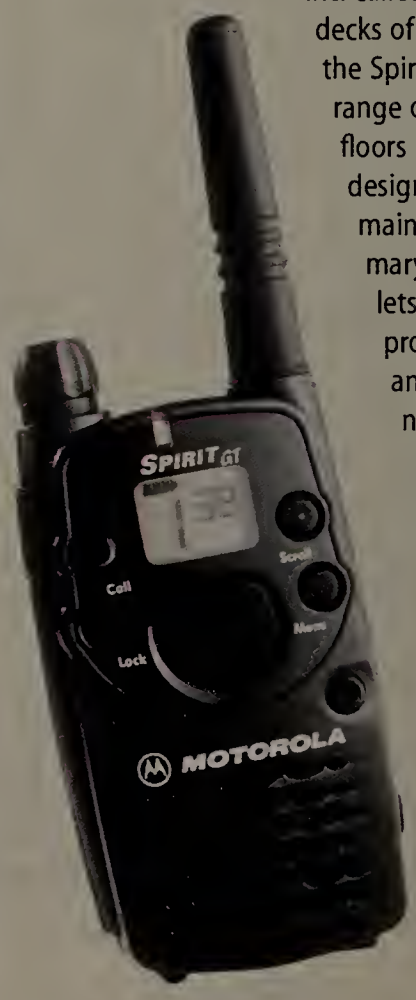
ONE OF THE TOUGHEST PARTS ABOUT DEVELOPING APPLICATIONS for a relatively new platform—say, handheld computers—is testing the applications. To aid developers, Bsquare Corp. has developed **CEValidator** so that programmers can skip writing custom test programs and go through the quality assurance process faster—significantly accelerating the deployment of Windows CE-based devices.

CEValidator key features include almost 1,500 individual pass/fail tests grouped in more than 100 suites for testing over 200 Windows CE-based API functions. It includes five stress-testing methods that create conditions of low virtual memory, low storage memory, CPU cycle deprivation, random execution order, and infinite repetition execution. It can also measure memory, test run timing information and do regression testing. It has configurable logging and reporting options.

CEValidator runs on a Windows NT 4.0-based host. A suggested retail price of $35,000 covers an entire site. Test packages including CEValidator and customized software consulting are also available and priced on a per-project basis. For more information, call 425 519-5900 or visit *www.bsquare.com.*

Push-Button Communication

IF YOUR WORKFORCE FINDS WALKIE-TALKIES HEAVY AND BULKY, but management likes their reliability, you may be able to make both sides happy with a new, smaller two-way radio from Motorola Inc. called the **Spirit GT**. About the size of two decks of cards (4 inches x 2.5 inches x 1.2 inches), the Spirit GT weighs under 7 ounces and has a range of up to 200,000 square feet, as well as 15 floors indoors and 4 miles outdoors. It's designed for use by not only construction, maintenance and security personnel (its primary base) but also by workers in retail outlets, restaurants, hotels, nightclubs, schools, property management, day care facilities and other service-based businesses that need to provide quick customer results.



To contact another user, you just push one button. A call tone alerts users of incoming transmission, and an "interference eliminator" cuts out unwanted chatter. Motorola also offers hands-free capability, headsets and carrying cases. The suggested retail price is $189; a version called Spirit GT+, priced at $209, lets managers communicate on two channels and monitor channels for transmissions. For more information, call 800 448-6686 or visit *www.motorola.com/spirit.*

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e-mail directory with a centralized X.500 corporate directory. With 22,500 employees in 40 countries, this is no small task. "We want to let people located anywhere in the organization look each other up. The actual target system is the X.500 directory, which holds information about people's locations, telephone numbers and mail addresses," says Alston. He explains that Via can synchronize "alien" directories that have their own proprietary data formats and do not have a direct means of trading data with each other.

Cultural Issues

If you decide to establish a metadirectory, be prepared to grapple with data ownership issues that can generate office politics. Users in marketing might prefer their e-mail addresses in a first-name, last-initial format. But human resources wants to use full names. Someone has to relinquish ownership of name conventions for the common good, says Sony Pictures Entertainment's Dahle. "Most companies I've talked to that want to implement metadirectories say that 80 percent of the task is political—resolving the question about ownership of data. For so many years, we've had these fiefdoms in HR and IT and everywhere else in the company. Getting everyone to agree and relinquish control and trust each other is a big thing."

On the other hand, at large companies with offices located worldwide, directory management can become an easier task when users can update their own profile and contact information, and that information propagates to every directory in the company. "The metadirectory must first be populated with the right data, and the users themselves can provide that information," says Dorian Cougias, CIO at True North Communications Inc. in Chicago, a global advertising and public relations company with 483 locations in 89 countries. The company uses Oblix Inc.'s Corporate Services Automation software to let users update directory data. "Here, we have 12 people managing our messaging services, but there are 20,000 people in the company. If the user profile information is not self-service, the 12 administrators couldn't handle it all. We're an acquisitions company that buys a new company every few weeks, adding more names."

Visa's Nammari agrees. "For a large company, it is easier, faster and more efficient to have users update certain important information themselves than to have this done by IS staff. But at some companies, this may require training and a change in corporate culture." CIO

Providence, R.I.-based freelance writer John Webster can be reached at jwebs@tiac.net.

Java for Sun and Microsoft

IF YOU'RE DEVELOPING JAVA APPLICATIONS AND ARE WONDERING how you're going to get them to operate on workstations running Sun Solaris and PCs running Microsoft Windows, consider a different cuppa joe. Transvirtual Technologies Inc. has developed **Kaffe**, a Java development environment and virtual machine (VM) that supports both Microsoft Corp.'s and Sun Microsystems Inc.'s Java technologies in the same implementation. (Frequently, Java VMs cannot support programs with another development environment's Java extensions.) Kaffe lets developers write Java programs in a Windows environment and then run them on other platforms, including Linux, Solaris, DOS, ThreadX and SMX.

There is no charge as long as development is being done for desktops; the company is making Kaffe available on its Web site as open source code for desktop application development. The development environment is being licensed for development of applications for Internet appliances and embedded systems, including Windows CE at a price of $10,000 per developer; licensing starts at $25 per user for 100 users of the resulting application. For more information, call 800 828-3022 or visit *www.transvirtual.com*.

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The DVD Writer 3100i is an internal SCSI drive that reads and writes DVD+RW media at a speed of 1.25X or 1.7MBps, approximately equivalent to 11X CD-RW write speed. The HP DVD Writer 3100i is expected to begin shipping worldwide this fall with an estimated street price of $699; DVD-RW discs are expected to cost around $30 each. For more information, call 650 857-1501 or visit *www.hpdvd.com*.

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ShopTalk

The NRTC's Jim Gibbons on Business Collaboration

As the CIO of a cooperative organization, collaboration must be an important part of your job. How do you handle it?
I have to understand all of the relationships among the organizations that I deal with—how those organizations work and what they do. A major project of mine right now is convergent billing. There are three cooperative billing agencies (besides ours) that also provide billing services to the telecommunications cooperatives we support. Our members can go anywhere they want for billing services, so I have to show them why it's to their benefit to use our services. I have to offer cost savings and satisfy the unique billing requirements of cooperative members such as bundled billing for long distance and wireless, for example, or separate billing for each service they offer. That means creating individual billing solutions for every one of our members.

So in effect you need to collaborate with 900 constituents. How difficult is that?
There are a lot of political issues involved. The three different billing agencies have three different slants on billing.

How do you avoid working at cross purposes?
One diplomatic thing I do is use a host of different consultants. They enable me to talk to the members from a different angle; it's not us against them. It's easier to accept change when it's recommended by an independent party. For example, we have a data warehousing project we're working on that will serve the membership. Instead of me sitting here and outlining exactly what we're going to do, I hired a consultant to meet with cooperative members and internal staff to see what they wanted from a data warehouse. The consultant came up with a prioritized list of target items and recommended an implementation schedule. This approach diffuses the politics and heightens the buy-in.

Spotlight On:

Jim Gibbons, *vice president of IT and CIO, National Rural Telecommunications Cooperative (NRTC), Herndon, Va.*

- **Line of Business** A not-for-profit organization that provides telecommunications and IS services to member rural phone companies and utilities
- **Bio** Has been with NRTC for five years; previously director of project management for NetExpress Inc., a now-defunct international telecommunications company
- **Challenges** Providing customized services to 900 member companies

How has deregulation in the telecommunications and utilities industries affected your job?
Deregulation is driving us to offer diversified services to our cooperative members, such as Internet access, broadband wireless and wireless radio. The problem is that many executives in our member companies don't yet have a competitive mind-set because they have existed in a regulated environment for so long. They don't know how to treat competition and how to effectively service and grow a business. A big part of my job is to provide our cooperative members with services so that they can go out and sell in a competitive world. So I try to leverage economies of scale to create services for them—whether it's application development or consulting—at lower prices than they can get by acting alone.

Where does the Internet come in?
E-commerce is becoming a bigger issue, even though a lot of the rural communities that our member companies serve have no Internet access yet. One of the things we are examining is posting bills and billing information on the Internet. We're trying to show them that if they want to be in [the telecom and utilities] businesses now and in the future, it's necessary to offer services that don't require customers to pick up a phone whenever they have questions.

How do you measure your success in the job?
I take into account how the cooperatives are doing. If I do my job right, their businesses will grow.

–Megan Santosus

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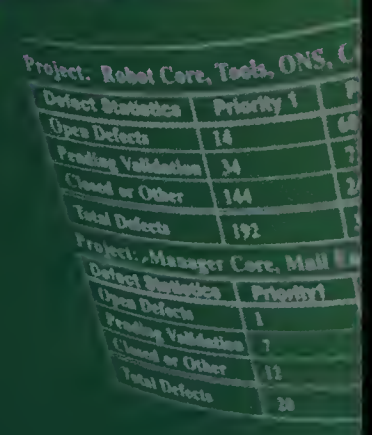

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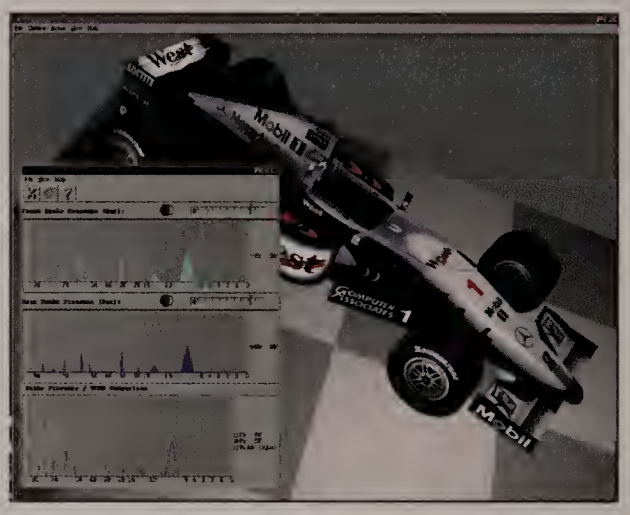

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